U.S. Department of the Interior
Bureau of Land Management
Colorado State Office

Grand Junction Field Office and Glenwood Springs Energy Office
October 2008

Environmental Assessment of the Orchard Master Development Plan for Oil and Gas Development

GJFO # DOI-BLM-CO-130-2009-0001-EA / GSFO # DOI-BLM-CO-140-2008-0032-EA

Prepared by Wildlife Specialties, LLC

for

Grand Junction Field Office
2815 H Road
Grand Junction, CO 81506

and

Glenwood Springs Energy Office
2425 South Grand Avenue, Suite 101
Glenwood Springs, CO 81601

FONSI

DOI-BLM-CO-130-2009-0001-EA

EnCana Oil & Gas (USA), Inc. – Orchard Master Development Plan

The environmental assessment analyzing the environmental effects of the proposed action, of exploration and development of the OMDP, has been reviewed. The analysis of the proposal, including appended and approved mitigation measures, results in a Finding of No Significant Impact on the human environment. Therefore, an environmental impact statement is not necessary to further analyze the environmental effects of the proposed action.

Decision Record

DECISION:

It is my decision to approve the Orchard Master Development Plan (OMDP) for:

- Natural gas well pads L19OU and K20OU on Federal lease COC64191, with access and pipeline;
- Natural gas well pads F18OU, K18OU, B19OU and H19OU on Federal lease COC58675, with access and pipeline
- Natural gas well pads D29OU and K29OU on Federal lease COC58676, with access and pipeline
- Natural gas well pads G30OU and J31OU on Federal lease COC58678, with access and pipeline
- Natural gas well pad D33OU on Federal lease COC64189, with access and pipeline
- Natural gas well pad OM36 on Federal lease COC64197, with access and pipeline
- Natural gas well pad OP13 on fee lease surface, with access and pipeline

This approval also incorporates the following:

- The analysis of impacts associated with well pad OM35 resulted in the decision that **OM35 not be permitted**. Impacts to cultural resources, sensitive plant and animal species, and Visual Resource Management, could not be mitigated and contributed to the denial of OM35.
- All permitted wells pads and associated infrastructure must conform to attached mitigation measures. Grand Junction Field Office Standard Conditions of Approval (COAs) are contained in Appendix D of this EA; site-specific Conditions of Approval are contained in Appendix F.
- Additional mitigation for impacts to wildlife and their habitats are located in the **Operator-Committed Mitigation** section of the EA. This mitigation is mutually agreed to by the BLM and EnCana Oil and Gas (U.S.A.) Inc. (EnCana).
- The APDs associated with the balance of the developments described in the OMDP are approved, subject to mitigation measures presented in Appendices D and F. This decision will provide for the orderly, economical, and environmentally sound exploration and development of oil and gas resources on valid oil and gas leases.

RATIONALE:

The analysis demonstrates that the Proposed Action, with mitigation, will allow EnCana to exercise valid Federal lease rights, with an acceptable level of impact to other natural resources. Implementation of a closed-loop drilling system will reduce pad disturbance and minimize each well pad's surface footprint, eliminate the need for a reserve pit, reduce fresh water use and reduce the need to transport water and drilling fluids by truck. This will result in fewer disturbances to wildlife and less dust and air pollution. Similarly, produced water collection by buried pipeline to a central facility wherever possible will also

minimize construction disturbance, truck traffic, dust and other impacts to air quality, as well as impacts to fragile soils and wildlife.

Mitigation for impacts to wildlife includes but is not limited to the treatment of 500 acres of sage habitat at a cost not to exceed $60,000 in addition to an additional $60,000 of funds provided to the BLM by EnCana for additional habitat improvements. These habitat improvements include, but are not limited to sage treatments to increase forage for deer and elk, water structures in remote locations to benefit all wildlife, etc. EnCana also will place a conservation easement on 160 acres of their Sunnyside property, located in T8S R96W, Sections 29 and 32, to protect against future development. Additional mitigation measures include the use of remote telemetry for well monitoring and fencing of facilities to exclude livestock and wildlife. These mitigation measures are the product of cooperation among the BLM, EnCana, and the Colorado Division of Wildlife. Site-specific COAs also call for the identification and protection of midget faded rattlesnake hibernacula located near well pad OM36. Standard COAs include Timing Limits for deer and elk, protection of sensitive habitats and raptor nesting. Nest and winter roost site buffers additionally will benefit raptors.

Best Management Practices (BMPs) will be used to prevent impacts to water and fragile soil resources. Adequately-sized culverts, where necessary, are incorporated into the Proposed Action for all ephemeral drainages; low water crossings are included as appropriate. New roads will be gated to prevent public access. A large work crew is not anticipated, but carpooling will be encouraged, to reduce traffic. Traffic during production would be minimal.

Mitigation measures include all of the actions that would reduce or minimize the effects of the proposed project. Most of these mitigation measures have been incorporated into the proposed action as discussed in the description of the alternative, as well as additional measures described for each of the resources. The proposed project would contribute to the cumulative effects associated with regional natural gas development.

Application of protective seasonal stipulations for vegetation removal, surveys for nesting raptors if construction is proposed for breeding seasons, mesh screens over open tanks, use of bird excluders on exhaust stacks, flagging over frac pits to discourage bird use, and reporting sick or dead birds should greatly reduce the probability of impacts on migratory and resident birds. Site-specific COAs to protect sensitive plant species are presented in Appendix F. Stormwater management plans and permits from the State's Water Quality Control Division will be required for all sites. Such Plans require establishment of positive, directed run-off management and implementation of site-specific adaptive BMPs such as ditches or berms, basins, straw wattles, or other erosion and sediment control methods, to reduce potential erosion and sediment production and transport. Plans also require systematic monitoring of the sites and BMPS and that they be maintained in good, functional condition. Stormwater management will help facilitate revegetation, and minimize erosion and resultant sediment production/transport, during all stages of the Proposed Action. Proper siting of pads, roads, and pipelines away from defined drainages and leaving vegetation buffer strips between disturbed areas and drainages will also minimize soil movement during overland flows, limit sediment transport into local streams, and protect soils vulnerable to wind and water erosion. Access road impacts will be mitigated by minimizing the amount of disturbance and vegetation removal, using water bars or dips and turnouts to minimize slope lengths, and timely revegetation with proper seedbed preparation. Pipeline impacts will be mitigated by minimizing disturbance and vegetation removal, by timely reclamation, and by soil preparation and revegetation with native plant species. Reestablishment of desirable species of native grasses, forbs, and shrubs will be included as part of interim and final reclamation. Use of new roads and facilities could result in indirect impacts to soil, air, and water quality, but use would be dispersed over a large area, minimizing potential for significant direct or indirect effects.

No effects to historic properties will occur; Conditions of Approval will adequately protect unidentified cultural resources and prevent adverse effects on known properties. Implementation of the proposed action would add to impacts of other energy development operations, motorized traffic and weed establishment. The Grand Junction RMP/EIS cumulative impact analysis also documents the cumulative impacts of the proposal.

MITIGATION MEASURES: Mitigation measures presented in **Operator-Committed Mitigation** and in Appendices D and F will be incorporated as Conditions of Approval for both surface and drilling operations.

PREPARED BY: Wildlife Specialties, L.L.C., Western Ecological Resource, Inc., and the Glenwood Springs Energy Office and Grand Junction Field Office of the BLM, Julia Christiansen, Project Lead.

SIGNATURE OF PLANNING AND ENVIRONMENTAL COORDINATOR, GRAND JUNCTION FIELD OFFICE:

Planning and Environmental Coordinator

10/14/08
Date

SIGNATURE OF AUTHORIZED OFFICER, GRAND JUNCTION FIELD OFFICE:

Authorized Officer

10/14/08
Date

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DOI-BLM-CO-140-2008-0032-EA

EnCana Oil and Gas (U.S.A.), Inc. – Orchard Master Development Plan

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Decision Record

DECISION:

It is my decision to approve the Orchard Master Plan of Development (OMDP) for:

- Natural gas well pads F15OU, C16OU, J16OU and M16OU on Federal lease COC58674, with access and pipeline
- Natural gas well pads G17OU and J18OU on Federal lease COC58675, with access and pipeline
- Natural gas well pads H20OU and A21OU on Federal lease COC64191, with access and pipeline
- Natural gas well pad K21OU on Federal leases COC55198 and COC64191, with access and pipeline

This approval also incorporates the following:

- All permitted wells pads and associated infrastructure must conform to attached mitigation measures. Glenwood Springs Energy Office Standard Conditions of Approval (COA) are contained in Appendix D of this EA; and site-specific Conditions of Approval are contained in Appendix F.
- Additional mitigation for impacts to wildlife and its habitat are located in the **Operator Committed Mitigation** section of the EA. This mitigation is mutually agreed to by the BLM and EnCana Oil and Gas (U.S.A.) Inc. (EnCana).
- The APDs associated with the balance of the developments described in the OMDP are approved subject to mitigation measures presented in **Operator-Committed Mitigation** section and Appendices D and F. This decision will provide for the orderly, economical, and environmentally sound exploration and development of oil and gas resources on valid oil and gas leases.

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The analysis demonstrates that the Proposed Action, with mitigation, will allow EnCana to exercise valid Federal lease rights, with an acceptable level of impact to other natural resources. Implementation of a closed-loop drilling system will reduce pad disturbance and minimize each well pad's surface footprint, eliminate the need for a reserve pit, reduce fresh water use and reduce the need to transport water and drilling fluids by truck. This will result in fewer disturbances to wildlife and less dust and air pollution. Similarly, produced water collection by buried pipeline to a central facility wherever possible will also minimize construction disturbance, truck traffic, dust and other impacts to air quality, as well as impacts to fragile soils and wildlife.

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PREPARED BY: Wildlife Specialties, L.L.C., Western Ecological Resource, Inc., and the Glenwood Springs Energy Office and Grand Junction Field Office of the BLM, Jim Byers, Project Lead.

SIGNATURE OF PLANNING AND ENVIRONMENTAL COORDINATOR, GLENWOOD SPRINGS FIELD OFFICE:

Planning and Environmental Coordinator

10-14-08
Date

SIGNATURE OF AUTHORIZED OFFICER, GLENWOOD SPRINGS FIELD OFFICE:

Authorized Officer

10-14-08
Date

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INTRODUCTION

EnCana Oil & Gas (USA), Inc. ("EnCana") is proposing a 2-to 3-year program of oil and gas development on approximately 12,067 acres of public, split-estate, and private lands located southeast of the Town of DeBeque, Colorado (Figure 1). This proposal, referred to as the Orchard II Master Development Plan (OMDP), encompasses approximately 6,640 acres previously developed under the Orchard Unit Geographic Area Plan (BLM 2005a).

The proposal consists of constructing, drilling, completing, and operating up to 93 new wells from up to 24 new well pads and one existing well pad. Ancillary facilities connected to the project include access roads, natural gas and water pipelines, and surface production equipment. Included in the proposal is a range of mitigation measures designed to minimize or eliminate impacts to surface and downhole resources.

The Department of the Interior, Bureau of Land Management, Glenwood Springs Energy Office (GSEO) and Grand Junction Field Office (GJFO) administer the Federal mineral estate in the OMDP area. In compliance with the National Environmental Policy Act (NEPA), the GSEO and GJFO have jointly prepared this environmental assessment (EA) which discloses the direct, indirect, and cumulative impacts of the proposal and a no action alternative and determines whether significant environmental impacts necessitating an environmental impact statement (EIS) will occur.

PURPOSE AND NEED FOR PROPOSED ACTION

The purpose of the action is to develop oil and gas resources on Federal leases COC55198, COC58674, COC58675, COC58676, COC58678, COC64189, COC64191, and COC64197 consistent with existing Federal lease rights. The action is needed to increase the development of oil and gas resources for commercial marketing to the public.

THE PROPOSED ACTION

The OMDP is intended to describe a future development strategy given current market conditions and company constraints. If fully developed, this proposal would result in up to 93 bottomhole locations drilled at 24 new well pads and one existing well pad. Pending approval, EnCana expects to drill up to 35 of the proposed wells by 2009 and an equal or greater number per year in subsequent years (i.e., up to a maximum of 93) (Figure 1).

However, the rate of development would depend largely on factors such as advances in technology, economics (e.g., the productivity of wells, the price of natural gas and the cost of services), and limitations on development attached to the various leases (e.g., lease stipulations and notices).
In light of these factors, all or any combination of the following developments could ultimately be implemented:

- 24 new well pads:
    - Four split-estate locations drilling 14 Federal bottomholes
    - 18 Federal surface locations drilling 69 Federal bottomholes
    - Two fee surface locations drilling six Federal bottomholes and one fee bottomhole
- 1 existing well pad:
    - One fee surface location drilling three Federal bottomholes

Associated with these developments would be the construction of up to 5.4 miles of new access roads and the improvement of 3 miles of existing two-track routes. Approximately 15.1 miles of pipelines are also proposed.

The OMDP area encompasses approximately 12,067 acres of Federal surface and mineral ownership within portions of Sections 4, 8-10, 13-21, 28-33, T8S, R96W; Sections 6 & 7, T9S, R96W; Sections 24, 35 & 36, T8S, R97W; and Sections 1, 12 & 13, T9S, R97W, Sixth Principal Meridian. Within the proposed development area, 9,454 acres are under the jurisdiction of the BLM (Glenwood Springs and Grand Junction Field Offices), 25 acres are under the jurisdiction of the Bureau of Reclamation, 56 acres are under the jurisdiction of the Forest Service, 1,760 acres are split estate (i.e., private surface with Federal mineral subsurface ownership), and 772 acres are private land with private mineral rights (Figure 2). As part of the proposed action, EnCana would apply for various BLM rights-of-way authorizing the construction of new access roads and pipelines to serve the proposed development, as appropriate.

Each major element of the proposed action is described below under the headings, **Development** (Construction/Drilling/Completion), **Production** (Operation and Maintenance), **Abandonment and Reclamation,** and **Operator-Committed Mitigation**. Associated with these developments is a standard 13-Point Surface Use Plan (SUP) (Appendix A) and a 10-Point Drilling Plan (Appendix B). With the BLM's approval, all measures discussed in these plans would be implemented as part of the proposed action.

Development – Construction, Drilling, and Completion

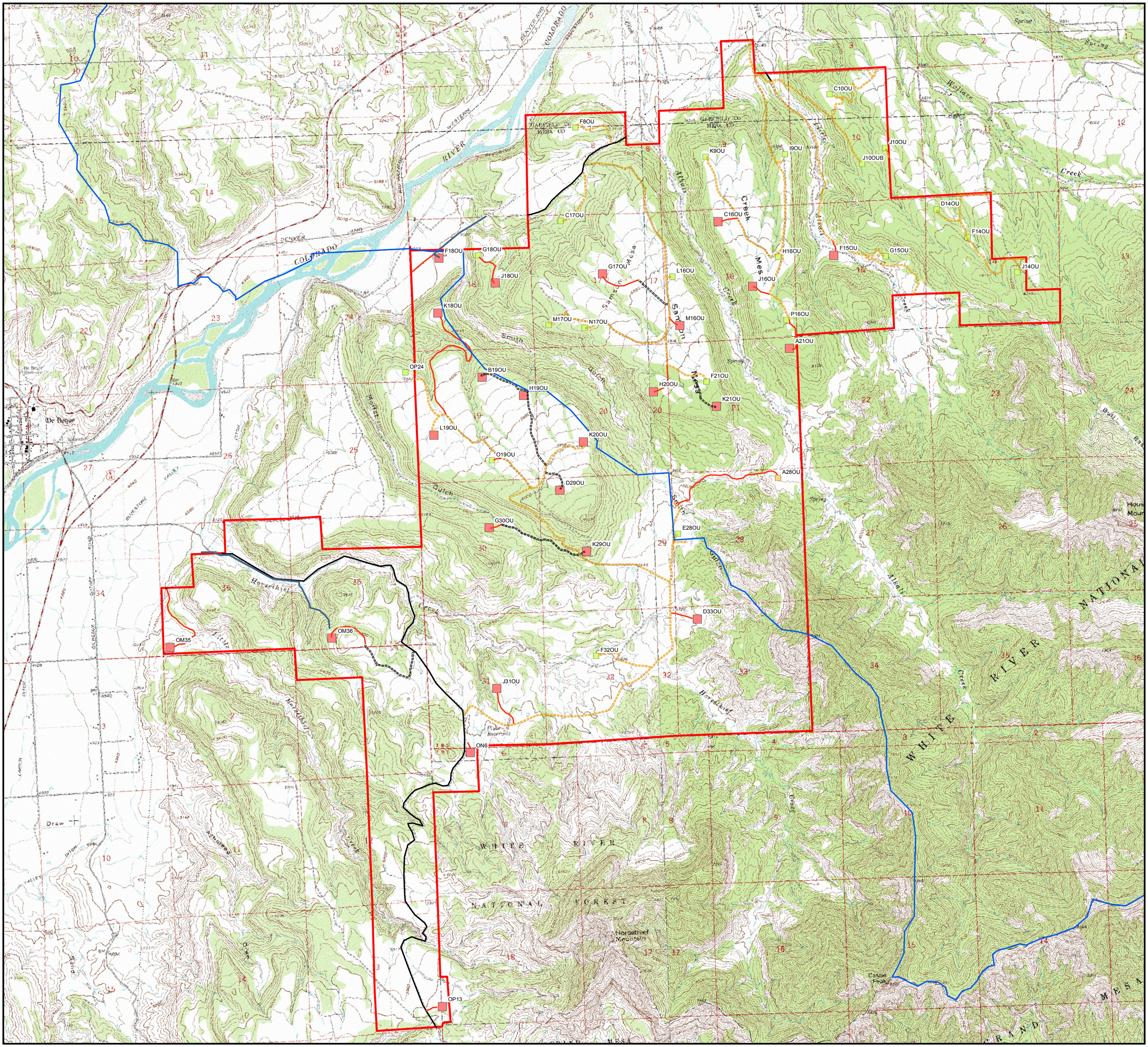
During the course of development, numerous construction activities would be completed. All of these activities could occur simultaneously. The following is a description of construction methods proposed for well pads, access roads, and gas gathering and produced water pipelines.
The locations of the various developments reflect the results of onsite exams conducted by the BLM, the operator, and subcontractors to assess proposed pad and pit layout, proposed access routes, cuts and fills, topsoil stockpiling, erosion control, and reclamation potential. The primary purpose of the onsite inspections was to assess potential resource impacts associated with their construction. In some cases, revisions to the original proposal were made to minimize potential impacts.

Construction

Proposed Well Pads

The proposed well pads would be constructed from the native soil and rock materials present using a bulldozer, grader, front-end loader, or backhoe. The pad would be constructed by clearing vegetation, stripping and stockpiling topsoil, and leveling the pad area using cut-and-fill techniques. Cut slopes associated with pad construction would be "step cut" as necessary and left rough to provide a seed catchment surface. The tops of the cut banks and pad corners may be rounded to improve their appearance.

Initially, the size of the newly constructed pads would range from 3.1 to 12.1 acres (Table 1). The variation in the size of the pads is a function of topography and the number of bottomhole locations targeted. The construction of the 24 pads would result in an estimated 235.6 acres of new short-term surface disturbance. The working area of the pad would remain disturbed throughout the long-term production phase of development. Long-term disturbance is estimated at a total of 66.6 acres.



Legend

- OMDP Boundary
- GJFO GSEO Boundary
- Approved Well Pad
- Existing Well Pad
- Proposed Well Pad
- Proposed Pipeline
- Existing Road
- Road Needing Improvement
- New Road
- County Road

Note: Well pads not to scale

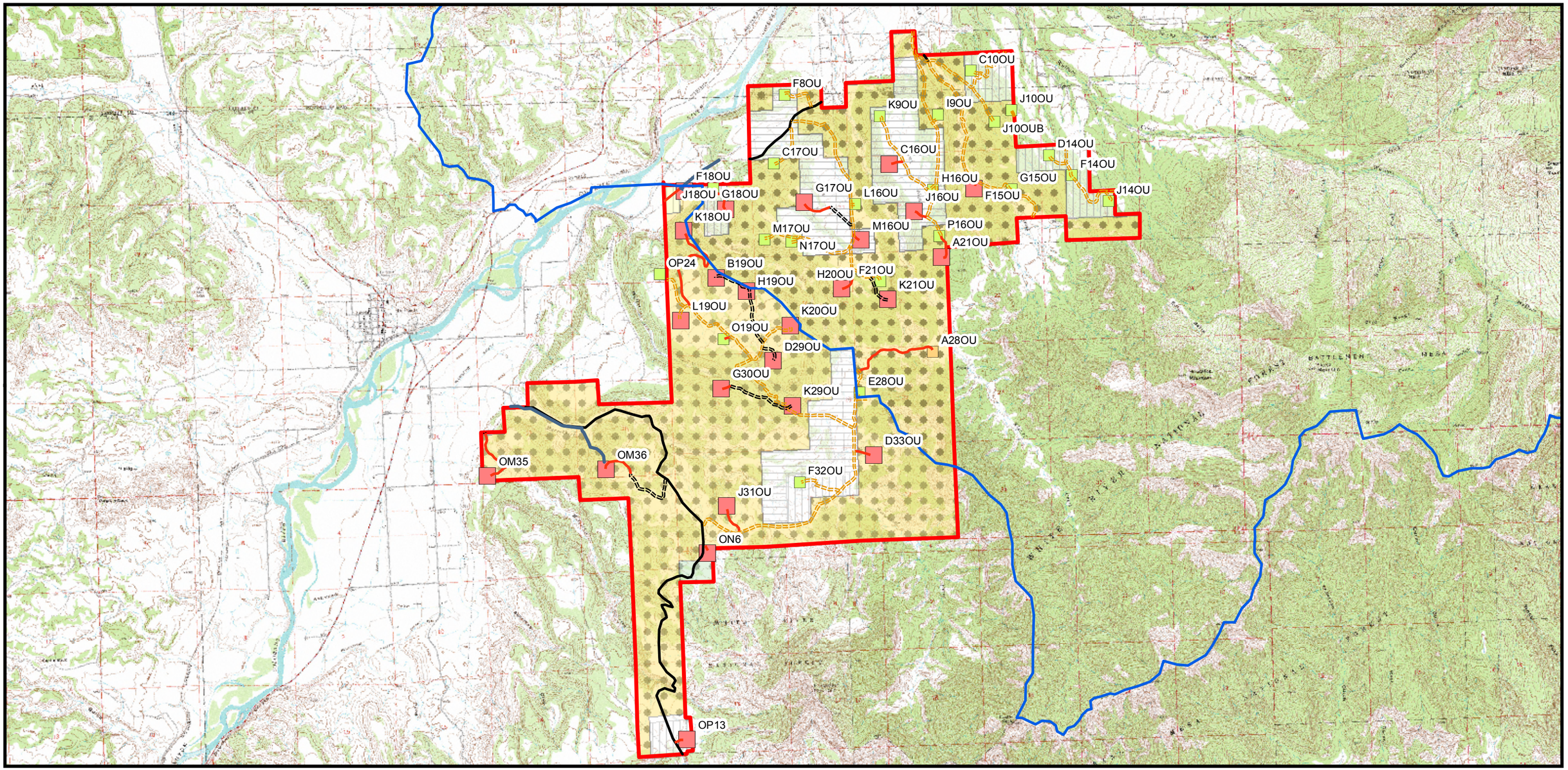
1 inch equals 2,000 feet
Scale: 1:24,000
Contour interval = 40 '
Date: September 2008

0 0.5 1 Miles

Figure 1: Orchard Master Development Plan project area.

BASE: U.S.G.S 7.5 Minute
DeBeque, Grand Valley,
Housetop Mountain, and
Red Pinnacle, Colorado Quadrangles

Prepared by: Wildlife Specialties, L.L.C.
P.O.B. 1231 Lyons, CO 80540
303-710-1286



Legend

- BLM — Fed Surface - Fed Minerals
- BOR — Pri Surface - Fed Minerals
- FOR — Pri Surface - Pri Minerals
- PRI — OMDP Boundary
- GJFO GSEO Boundary
- Approved Well Pad
- Existing Well Pad
- Proposed Well Pad

Note: Well pads not to scale

- Proposed Pipeline
- Existing Road
- Road Needing Improvement
- New Road
- County Road

1 inch equals 5,333 feet
Scale: 1:64,000
Contour interval = 40 '
Date: September 2008

BASE: U.S.G.S 7.5 Minute DeBeque, Grand Valley, Housetop Mountain, and Red Pinnacle, Colorado Quadrangles

0 1 2 Miles

Figure 2: Surface and mineral ownership within the OMDP.

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Table 1. Disturbance Associated with Proposed Well Pads, Access Roads, and Pipelines.
(GJFO pads shown with gray shading; GSFO pads shown without shading)

Well Pad	Mineral Lease	Short-term Pad Disturbance (acres)	Length of Associated Road and Pipeline (miles)		Short-term Road and Pipeline Disturbance (acres)		Total Short-term Disturbance (acres)	Total Long-term Disturbance (acres)
			Road	Pipeline	Road	Pipeline		
ON6	Unleased	4.9	0.03	0.67	0.2	3.2	8.3	1.7
OP13	Fee Lease	6.9	0.06	2.94	0.6	14.0	21.5	1.7
F15OU	COC58674	4.5	0.10	0.40	0.4	2.6	7.5	1.9
C16OU	COC58674	4.5	0.12	0.12	1.1		5.6	1.9
M16OU	COC58674	4.7	0.05	0.05	0.4		5.1	1.7
J16OU	COC58674	4.1	0.11	0.11	1.0		5.1	1.9
G17OU	COC58675	5.0	0.58	0.58	5.2		10.2	3.6
F18OU	COC58675	4.6	0.72	0.47	3.1	3.1	10.8	4.1
K18OU	COC58675	4.1	1.25	1.25	11.4		15.5	6.1
J18OU	COC58675	5.4	0.22	0.22	2.0		7.4	2.3
B19OU	COC58675	5.2	0.13	0.13	1.2		6.4	2.0
H19OU	COC58675	4.6	0.85	1.02	7.7	0.8	13.1	4.6
L19OU	COC64191	5.0	0.09	0.09	0.8		5.8	1.8
H20OU	COC64191	5.4	0.21	0.21	1.9		7.3	2.3
K20OU	COC64191	5.3	0.44	0.44	4.0		9.3	3.1
A21OU	COC64191	5.6	0.22	0.22	2.0		7.6	2.3
K21OU	COC55198 COC64191	4.3	0.30	0.30	2.7		7.0	2.6
D29OU	COC58676	4.9	0.19	0.19	1.7		6.6	2.2
K29OU	COC58676	12.1	0.02	0.02	0.2		12.3	1.6
G30OU	COC58678	5.6	0.05	0.05	0.4		6.0	1.7
J31OU	COC58678	3.1	0.26	1.62	1.1	7.9	12.1	2.4
D33OU	COC64189	5.8	0.16	0.16	1.5		7.3	2.1
OM35	COC64197	4.9	1.24	2.27	5.2	11.0	21.1	6.0
0M36	COC64197	4.9	0.96	1.58	4.1	7.7	16.7	5.0
	Totals	125.4 acres	8.36 miles	15.11 miles	110.2 acres		235.6 acres	66.6 acres

Short-term Disturbance Assumptions:
Typically pipelines would be buried alongside proposed roads with total width of short-term disturbance for new road and pipelines estimated at 75 feet. In situations where pipelines would be buried alongside an existing field development road, short-term disturbance width of pipeline is estimated at 40 feet. Pipelines buried in separate corridor would have short-term disturbance area not to exceed 55 feet. Where only new road would be constructed, short-term disturbance width estimated at 35 feet.
Long-term Disturbance Assumptions:
For well pads, the long-term disturbance of the "working" area of each pad is estimated at 1.5 acres. Long-term disturbance width for proposed roads is estimated at 30 feet. Since pipelines would be reclaimed in their entirety, no long-term disturbance area for pipelines is calculated.
The disturbance areas for proposed pads and associated roads and pipelines were taken from survey plats provided by Tri-State Land Surveying & Consulting of Vernal, Utah in Jan-Aug. 2007.

Typically in the past, a conventional reserve pit or cuttings pit would be excavated for storage of drilling fluids on each well pad during the ongoing drilling operations. Given the variation in the size and dimensions of the proposed well pads and the number of proposed wells that may be drilled at any given location, the size of the reserve pits would vary. If a pit would be constructed, in order to safely contain cuttings and drilling fluids, reserve pits would be constructed to allow for a minimum of 2 feet of free board between the maximum fluid level and the top of the pit's berm. In addition to the berm, catchments would be excavated around the pits to prevent the infiltration of stormwater.

EnCana would implement a closed-loop drilling system when feasible that would recycle drilling fluids, thereby eliminating the need for a reserve pit. If this method is used, a system to separate fluids from drill cuttings would be used and a containment berm would be constructed on the pad to collect and further dry the cuttings. If the system is not used, a conventional reserve pit would be excavated. Under the conventional method, the fluids would be allowed to evaporate unless an alternative method of disposal is approved. Because multiple wells would be drilled at each pad, the pit would not be reclaimed until all wells have been drilled on each respective pad.

A fence would be constructed around each reserve and/or frac pit to protect domestic livestock. The fence would remain until all wells have been drilled and completed.

After all wells are drilled, completed, and production facilities are installed at each pad, interim reclamation activities would begin. Generally, cuts would be revegetated and fills would be recontoured to blend in with adjacent natural slopes and seeded to reestablish vegetative cover. These interim reclamation techniques would reclaim about a 70 percent reduction in surface disturbance, the remaining 30% would remain over the long-term life of the project (i.e., 20 to 30 years).

Existing Well Pad

One existing well pad (F32OU) was constructed using the same general methodology as proposed for the new pads. The development of the three Federal wells proposed for the F32OU location would not require new surface disturbance.

Proposed Access Roads

To provide access to the proposed surface locations, the construction of approximately 5.4 miles of new roads is proposed. In addition, 3 miles of existing two-track roads would be improved.

Three existing county road networks would be used to access the OMDP area - Mesa County Roads V.00 and V.50 and Garfield County Road 306 (CR306). The V.00 road would serve existing and proposed well pads along Horsethief Creek and would provide primary access to that portion of the project area administrated by the GJFO. The V.50 road would serve developments proposed on the DeBeque Wildlife Area (Bureau of Reclamation property) and Samson Mesa. The Creek Mesa and Little Alkali Creek areas of the project area would be served by CR306 south of the Una Bridge area.

The proposed roads would be constructed to meet standards for the anticipated traffic flow and all-weather requirements. Roads and gathering pipelines would be constructed within a 75-foot disturbance corridor, which would be reduced to 20 foot finished road surface (including bar ditch) after interim reclamation (see Table 1). Bulldozers, trackhoes, and/or road graders would first clear vegetation and topsoil. The road would then be constructed using standard equipment and techniques approved by the BLM, which could include ditching, draining, crowning, surfacing, sloping, and dipping the roadbed as necessary.

The average road grade would be 10% or less, wherever possible. The 10% grade would only be exceeded in areas where physical terrain or unusual circumstances require it. Minimum horizontal curve radii would be 100 feet. Where terrain would not allow a 100-foot curve radius, the curve would be widened. Road and pipeline construction would result in approximately 110.2 acres of short-term ground disturbance. Following interim reclamation, the long-term surface disturbance associated with roads would be approximately 32.1 acres.

Where required, drainage crossings would be of the typical dry creek type. Crossings would be designed to minimize siltation and the accumulation of debris in the drainage crossing. Water diversions including cut-outs would be placed at frequent intervals along access roads to prevent the erosion of drainage ditches, as described in the *Surface Operating Standards for Oil and Gas Exploration & Development* – The Gold Book (BLM and USFS 2006).

The access roads would be inspected and maintained on a quarterly basis, at a minimum, and could include such actions as:

- grading of the road surface,
- cleaning relief ditches, culverts, and cattle guards,
- implementing supplemental erosion control measures,
- closing roads in periods of excessive soil moisture,
- implementing road and slope stabilization measures,
- conducting weed control, and
- applying dust abatement measures.

The operator would be required to obtain various right-of-way authorizations for its use of roads and pipelines outside the Orchard Unit and/or on segments that fall outside the operator's Federal leases.

Proposed Gas Gathering and Water Pipelines

A gas gathering and produced water pipeline network would be needed to gather and deliver gas offsite to existing trunk pipelines and transport produced water to centralized tank batteries within and outside the project area. The gathering system for the 24 proposed well pads would connect with the recently-installed West Orchard aka Sunnyside trunk pipeline (16-inch diameter), analyzed in NEPA document EA# CO140-07-055.

Approximately 15.1 miles of pipelines would be constructed to serve the proposed well pads. The majority of the gathering system (14.2 miles) would be buried alongside access roads within a 75-foot access road/pipeline right-of-way. Pipeline segments serving the F15OU and F18OU pads (totaling 0.9 mile) would be buried in separate pipeline corridors with construction right-of-way width of 55 feet. Another 0.4 mile of surface pipeline (maximum 40 foot wide disturbance corridor) would be installed north from the OM36 to Horsethief Creek (CR V.00) Road to serve the OM35 pad. As shown in Table 1, there would be 110.2 acres of short-term disturbance calculated for roads and pipelines. No long-term disturbance area would be attributed to the pipeline system, assuming that all pipeline corridors would be reclaimed using best management practices.

All pipelines would be buried to a minimum depth of 4 feet from surface to top of pipe. The pipeline trench would be excavated mechanically; pipe segments would then be welded together and tested, lowered into the trench, and covered with excavated material. Generally, a mile of pipeline would be constructed in 4 to 7 days.

Each pipeline would be pressure tested with fresh water and/or nitrogen gas to locate any leaks. Fresh water or nitrogen used for testing would be obtained offsite and transported to the testing location by truck. After testing, water used in pressure testing of lines will be disposed at a State-approved facility or reused for drilling and/or completion operations. Nitrogen would be vented to the atmosphere if used instead of water.

Most of the access road and gathering lines serving the well pads within the Orchard Unit boundary (Appendix C) would not be subject to BLM right-of-way authorizations because of regulations inherent with Federal units. However, the portion of the road and pipeline in T9S R97W, Section 1 serving the OM36 pad would require BLM right-of-way grant from Grand Junction Field Office. Portions of the proposed road and pipeline that would serve the OP13 would also require BLM right-of-way grant from Grand Junction Field Office for the pipeline segment falling within Sections 6, T9S R96W and Sections 12 and 13, T9S R97W. Furthermore, the OP13 road and pipeline crossing Section 6, T9S R96W would require a US Forest Service Road Use Permit for the road authorization and Special Use Permit for the pipeline.

Mitigation Common to All Construction Operations

All trees removed during construction activities would be cut to a maximum stump height of 6 inches, bucked into 4-foot lengths, and either stacked off location or windrowed to serve as silt catchments. Pinyon pine trees would be chipped, buried, or disposed to prevent the spread of the pinyon *Ips* beetle. Rootballs would be buried, placed offsite, or scattered over the disturbed area as part of final reclamation. Other vegetation, such as sagebrush and other shrubs, may be scattered offsite or placed on well pad fills to help screen the pads. Cleared and grubbed juniper trees could be windrowed along toe of pad or road fill slopes, and placed over pad and pipeline disturbances.

Drilling and Completion

Up to 93 vertically and directionally drilled wells would be developed as part of the proposed action. Table 2 provides surface and bottomhole locations for the proposed well pads and wells. The number of wells proposed for drilling in 2009 is 35. While the proposed number of wells per pad is well-established over much of the OMDP area, the drilling program in the southwest portion of the OMDP area is exploratory in nature. In this area, drilling would initially be limited to 1 to 2 wells per pad. Production results from these wells would be used to plan the 2010 and 2011 drilling programs. Fewer wells may be drilled than are proposed because of geologic and market uncertainties.

EnCana's drilling operations would be conducted in compliance with all Federal Oil and Gas Onshore Orders, and all applicable rules and regulations. The drilling operation would be conducted in two phases. The first phase may use a small drilling rig to drill to a depth of approximately 630 to 1,500 feet, or 50 feet below the base of any freshwater aquifers encountered. This surface hole would be cased with steel casing and cemented in place entirely from a depth of about 630 to 1,500 feet to ground level. This surface casing would serve the purposes of providing protection for any freshwater aquifers present and to contain pressure that may be encountered while drilling deeper. The BLM would be notified in advance of running surface casing and cement in order to witness these operations. This part of the drilling operation would normally take 2 to 3 days to complete.

Table 2. Surface and Bottomhole Locations of Proposed Wells. (GJFO pads shown with gray shading; GSFO pads shown without shading)				
Lease	**Proposed Pad**	**Proposed Wells**	**Surface Location**	**Bottomhole Location**
Currently Unleased pending 11/8/07 BLM Lease Sale	ON6 (Four wells) Note: 4 wells will be drilled into adjacent existing BLM leases	Orchard Unit 31-14	Lot 3, Section 6, T9S R96W	Section 31,T8S R96W 660 FSL 1980 FWL
		Orchard Unit 31-15		Section 31, T8S R96W 660 FSL 1980 FEL
		Orchard Unit 7-3		Section 7, T9S R96W 660 FNL 1980 FWL
		Orchard Unit 7-4		Section 7, T9S R96W 660 FNL 660 FWL
Fee Lease (Surface)	OP13 (Four wells)	Federal 18-12	SE¼SE¼, Section 13 T9S R97W	Section 18, T9S R96W 1980 FSL 660 FWL
		Federal 18-13		Section 18, T9S R96W 660 FSL 660 FWL
		Federal 18-14		Section 18, T9S R96W 660 FSL 1980 FWL
		Federal 19-4		Section 19, T9S R96W 660 FNL 660 FWL
COC58674	F15OU (Five wells)	Orchard Unit 15-3	SE¼NW¼, Section 15 T8S R96W	Section 15, T8S R96W 660 FNL 1980 FWL
		Orchard Unit 15-4		Section 15, T8S R96W 660 FNL 660 FWL
		Orchard Unit 15-6		Section 15, T8S R96W 1980 FNL 1980 FWL
		Orchard Unit 15-11		Section 15, T8S R96W 1980 FSL 1980 FWL
		Orchard Unit 15-12		Section 15, T8S R96W 1980 FSL 660 FWL
	C16OU (Five wells)	Keinath Federal 16-2	NE¼NW¼, Section 16 T8S R96W	Section 16, T8S R96W 660 FNL 1980 FEL
		Keinath Federal 16-3		Section 16, T8S R96W 660 FNL 1980 FWL
		Keinath Federal 16-4		Section 16, T8S R96W 660 FNL 660 FWL
		Keinath Federal 16-6		Section 16, T8S R96W 1980 FNL 1980 FWL
		Keinath Federal 9-15		Section 9, T8S R96W 660 FSL 1980 FEL
	J16OU (Two wells)	Keinath Fed 16-10	NW¼SE¼, Section 16 T8S R96W	Section 16, T8S R96W 1980 FSL 1980 FEL
		Keinath Fed 16-11		Section 16, T8S R96W 1980 FSL 1980 FWL
	M16OU (Three wells)	Keinath Fed 16-13	SW¼SW¼, Section16 T8S R96W	Section 16, T8S R96W 660 FSL 660 FWL
		Keinath Fed 16-14		Section 16, T8S R96W 660 FSL 1980 FWL
		Keinath Fed 17-16		Section 17, T8S R96W 660 FSL 660 FEL
COC58675	G17OU (Four wells)	Orchard Unit 17-6	SW¼NE¼, NW¼SE¼ Section 17 T8S R96W	Section 17, T8S R96W 1980 FNL 1980 FWL
		Orchard Unit 17-7		Section 17, T8S R96W 1980 FNL 1980 FEL
		Orchard Unit 17-2		Section 17, T8S R96W 660 FNL 1980 FEL

Table 2. Surface and Bottomhole Locations of Proposed Wells. (GJFO pads shown with gray shading; GSFO pads shown without shading)				
Lease	**Proposed Pad**	**Proposed Wells**	**Surface Location**	**Bottomhole Location**
		Orchard Unit 17-10		Section 17, T8S R96W 1980 FSL 1980 FEL
	F18OU (Three wells)	Orchard Unit 18-4	SE¼NW¼, Section 18 T8S R96W	Section 18, T8S R96W 660 FNL 650 FWL
		Orchard Unit 18-5		Section 18, T8S R96W 1980 FNL 660 FWL
		Orchard Unit 24-1		Section 24, T8S R97W 660 FNL 660 FEL
	J18OU (Three wells)	Keinath 18-10 (fee)	NW¼SE¼, NE¼SE¼ Section 18 T8S R96W	Section 18, T8S R96W 1960 FSL 1960 FEL
		Keinath Federal 18-9		Section 18, T8S R96W 1950 FSL 660 FEL
		Keinath Fed 18-15		Section 18, T8S R96W 660 FSL 1960 FEL
	K18OU (Four wells)	Orchard Unit 18-11	Lots 3, 4, NE¼SW¼, SE¼SW¼, Section 18 T8S R96W	Section 18, T8S R96W 1970 FSL 1495 FWL
		Orchard Unit 18-12		Section 18, T8S R96W 1970 FSL 415 FWL
		Orchard Unit 18-13		Section 18, T8S R96W 655 FSL 415 FWL
		Orchard Unit 18-14		Section 18, T8S R96W 655 FSL 1505 FWL
	B19OU (Four wells)	Orchard Unit 19-2	NW¼NE¼ Section 19 T8S R96W	Section 19, T8S R96W 650 FNL 1980 FEL
		Orchard Unit 19-3		Section 19, T8S R96W 650 FNL 1610 FWL
		Orchard Unit 19-6		Section 19, T8S R96W 1930 FNL 1520 FWL
		Orchard Unit 19-7		Section 19, T8S R96W 1930 FNL 2030 FEL
	H19OU (Four wells)	Orchard Unit 19-8	SE¼NE¼ Section 19 T8S R96W	Section 19, T8S R96W 1983 FNL 679 FEL
		Orchard Unit 19-9		Section 19, T8S R96W 1960 FSL 660 FEL
		Orchard Unit 20-5		Section 20, T8S R96W 1910 FNL 530 FWL
		Orchard Unit 19-1		Section 19, T8S R96W 660 FNL 660 FEL
COC64191	L19OU (Three wells)	Orchard Unit 19-11	Lot 3, Section 19 T8S R96W	Section 19, T8S R96W 1960 FSL 1540 FWL
		Orchard Unit 19-12		Section 19, T8S R96W 2022 FSL 650 FWL
		Orchard Unit 19-13		Section 19, T8S R96W 665 FSL 650 FWL
	H20OU (Three wells)	Orchard Unit 20-8	SE¼NE¼ Section 20 T8S R96W	Section 20, T8S R96W 1980 FNL 660 FEL
		Orchard Unit 20-1		Section 20, T8S R96W 660 FNL 660 FEL
		Orchard Unit 20-9		Section 20, T8S R96W 1980 FSL 660 FEL
	K20OU (Five wells	Orchard Unit 20-10	NE¼SW¼ Section 20 T8S R96W	Section 20, T8S R96W 1960 FSL 1950 FEL

Table 2. Surface and Bottomhole Locations of Proposed Wells. (GJFO pads shown with gray shading; GSFO pads shown without shading)				
Lease	**Proposed Pad**	**Proposed Wells**	**Surface Location**	**Bottomhole Location**
		Orchard Unit 20-11		Section 20, T8S R96W 1970 FSL 1890 FWL
		Orchard Unit 20-12		Section 20, T8S R96W 1980 FSL 630 FWL
		Orchard Unit 20-13		Section 20, T8S R96W 660 FSL 640 FWL
		Orchard Unit 20-14		Section 20, T8S R96W 660 FSL 1930 FWL
	A21OU (Four wells)	Orchard Unit 21-1	NE¼NE¼ Section 21 T8S R96W	Section 21, T8S R96W 515 FNL 301 FEL (vertical well)
		Orchard Unit 21-2		Section 21, T8S R96W 660 FNL 1980 FEL
		Orchard Unit 21-8		Section 21, T8S R96W 1980 FNL 660 FEL
		Orchard Unit 22-4		Section 22, T8S R96W 660 FNL 660 FWL
COC55198 COC64191	K21OU (Four wells)	Orchard Unit 21-10	SE¼NW¼, NE¼SW¼ Section 21 T8S R96W	Section 21, T8S R96W 1980 FSL 1980 FEL
		Orchard Unit 21-11		Section 21, T8S R96W 1980 FSL 1980 FWL
		Orchard Unit 21-12		Section 21, T8S R96W 1980 FSL 660 FWL
		Orchard Unit 21-14		Section 21, T8S R96W 660 FSL 1980 FWL
COC58676	D29OU (Four wells)	Orchard Unit 29-3	NW¼NW¼ Section 29 T8S R96W	Section 29, T8S R96W 660 FNL 1980 FWL
		Orchard Unit 29-4		Section 29, T8S R96W 660 FNL 660 FWL
		Orchard Unit 29-5		Section 29, T8S R96W 1980 FNL 660 FWL
		Orchard Unit 30-1		Section 29, T8S R96W 660 FNL 650 FEL
	K29OU (Six wells)	Orchard Unit 29-11	NE¼SW¼ Section 29 T8S R96W	Section 29, T8S R96W 2249 FSL 1769 FWL (vertical well)
		Orchard Unit 29-6		Section 29, T8S R96W 2030 FNL 1960 FWL
		Orchard Unit 29-10		Section 29, T8S R96W 2020 FSL 1970 FEL
		Orchard Unit 29-12		Section 29, T8S R96W 2050 FSL 660 FWL
		Orchard Unit 29-14		Section 29, T8S R96W 660 FSL 1980 FWL
		Orchard Unit 29-7		Section 29, T8S R96W 1980 FNL 1980 FEL
COC58678	G30OU (Four wells)	Orchard Unit 30-7	SW¼ NW¼, NE¼, Section 30 T8S R96W	Section 30, T8S R96W 2023 FNL 2037 FEL (vertical well)
		Orchard Unit 30-6		Section 30, T8S R96W 2066 FNL 1538 FWL
		Orchard Unit 30-8		Section 30, T8S R96W 2064 FNL 661 FEL

Table 2. Surface and Bottomhole Locations of Proposed Wells. (GJFO pads shown with gray shading; GSFO pads shown without shading)				
Lease	**Proposed Pad**	**Proposed Wells**	**Surface Location**	**Bottomhole Location**
		Orchard Unit 30-10		Section 30, T8S R96W 2038 FSL 1975 FEL
	J31OU (One well)	Federal 31-10	NW¼SE¼ Section 31 T8S R96W	Section 31, T8S R96W 2159 FSL 1839 FEL (vertical well)
Fee Lease (Surface)	***Existing Well Pad*** F32OU (Three wells)	EnCana Federal 32-3	SE¼NW¼ Section 32 T8S R96W	Section 32, T8S R96W 680 FNL 2000 FWL
		EnCana Federal 32-4		Section 32, T8S R96W 680 FNL 660 FWL
		EnCana Federal 32-5		Section 32, T8S R96W 2060 FNL 670 FWL
COC64189	D33OU (Four wells)	Orchard Unit 33-4	NW¼NW¼ Section 33 T8S R96W	Section 33, T8S R96W 660 FNL 660 FWL
		Orchard Unit 33-3		Section 33, T8S R96W 660 FNL 1980 FWL
		Orchard Unit 33-5		Section 33, T8S R96W 1980 FNL 660 FWL
		Orchard Unit 28-13		Section 28, T8S R96W 660 FSL 660 FNL
COC64197	OM35 (Three wells)	Federal 35-13	SW¼SW¼ Section 35 T8S R97W	Section 35, T8S R97W 660 FSL 660 FWL
		Federal 35-12		Section 35, T8S R97W 1980 FSL 660 FWL
		Federal 35-14		Section 35, T8S R97W 660 FSL 1980 FWL
	OM36 (Four wells)	Federal 36-13	SE¼SW¼ Section 36 T8S R97W	Section 36, T8S R97W 660 FSL 660 FWL
		Federal 35-16		Section 36, T8S R97W 660 FSL 660 FEL
		Federal 36-12		Section 36, T8S R97W 1980 FSL 660 FWL
		Federal 36-14		Section 36, T8S R97W 660 FSL 1980 FWL

Prior to drilling below the surface casing, a Blowout Preventer (BOP) would be installed on the surface casing, and both the BOP and surface casing would be tested for pressure integrity. The BOP and related equipment would meet the minimum requirements of Onshore Oil and Gas Order No. 2, and the BLM would be notified in advance of all pressure tests. Following the use of the surface-hole rig, if used, a larger drilling rig would be used to drill to target depths of about 7,200 to 10,000 feet. A downhole mud motor may be used to increase penetration rate. The rig would pump drilling fluids to drive the mud motor, cool the drill bit, and remove cuttings from the well bore.

To achieve borehole stability, minimize possible damage to the formations, provide adequate viscosity to carry the drill cuttings out of the well bore, and reduce downhole fluid losses, various non-toxic chemicals and certain materials may need to be added to the mud system.

For the directional wells, an S-shaped directional design would be used to reach the targeted bottomhole locations. In general, a target radius of 200 feet would be used. Specific directional plans for each well will be included with the APDs. Downhole operations would be done with tools to facilitate proper direction and path of the well.

EnCana, depending on rig availability, intends to implement a closed-loop drilling system in the OMDP using a drill rig outfitted with special equipment designed to recycle drilling fluids and deposit the cuttings on location without the use of a conventional reserve pit. Cuttings are moved through a shaker system on the drill rig that captures drilling fluids from the cuttings. The cuttings are typically placed on the pad location within a containment berm until enough are collected to mix with Solibond, powdered gypsum, or similar material to further dry and achieve a solid state. The solidified cuttings typically remain on the pad location and are spread on location during the interim reclamation phase of the pad when excavation equipment is used to reshape and contour the pad. If a drill rig with closed-loop system is not available when the proposed wells are scheduled for drilling, an open pit rig with an excavated reserve pit would be used to drill the wells. The drilling plan and survey plats included in the APDs submitted to the BLM would specify the planned drilling system (closed-loop or open pit). If open pit drilling method is used, a lined reserve pit to receive the drill cuttings from the well bore (e.g., shale, sand, and miscellaneous rock minerals) and to contain drilling fluids carried over with the cuttings would be constructed on the pad. No hazardous substances would be placed in the pit.

After drilling the hole to its final depth, logging tools would be run into the well to evaluate the potential hydrocarbon resource. If the evaluation indicates adequate hydrocarbon resources are present and recoverable, steel production casing would be run and cemented into place in accordance with the well design as approved by the BLM and any applicable Conditions of Approval (COAs). The proposed casing and cementing program would be designed to protect and/or isolate all usable water zones, potentially productive zones, lost circulation zones, abnormally pressured zones, and any prospectively valuable deposits of minerals. BLM approval is required prior to the use of any isolating medium other than cement.

After production casing has been cemented in place, the drilling rig would be removed, and a completion rig would be moved in. Well completion consists of running a Cement Bond log to evaluate cement integrity and to correlate the cased-hole logs to the open-hole logs. The casing is then perforated across the hydrocarbon producing zones, and the formation is stimulated to enhance the production of oil and gas. The typical method used for stimulation consists of a hydraulic fracture treatment in which sand and non-toxic fluids are pumped into the producing formation with sufficient pressure to fracture the rock formation. The sand serves as a propellant to keep the created fracture open, thereby allowing reservoir fluids to move more efficiently into the well bore.

A natural gas well in this OMDP would require about 12 to 15 days to drill and 30 to 45 days to complete. Pads with multiple well bores would be occupied for a more extended period of time, depending on the number of well bores. When possible, all well bores planned on individual pads would be drilled and completed within one drilling season and the pad reclaimed.

Production - Operation and Maintenance

Surface Facilities

Surface facilities at each well pad location would consist of wellheads, separation/dehydration units, and aboveground condensate and produced water tanks with approximately 300- to 400-barrel capacities. Multi-well locations would share production equipment, whenever feasible, to minimize surface occupancy/disturbance. All production equipment would be painted to match the surrounding terrain and located to reasonably minimize visual impact. BLM would select the color for all facilities, including containment rings, at sites associated with Federal surface or with the development of Federal mineral estate.

The production equipment would be fenced to prevent contact with grazing livestock. Telemetry equipment would be used to remotely monitor well conditions after a reasonable level of development.

The use of telemetry would minimize traffic to and from the well locations. A pumper truck will be required to visit the pads for tank gauging.

Tank batteries would be placed within secondary containment to prevent the offsite migration of accidentally spilled condensate or produced water. Secondary containment would consist of corrugated steel containment berms or earthen berms. Compaction and construction of earthen berms surrounding the tank batteries would be performed to prevent lateral movement of fluids through the utilized materials. Secondary containment would be sized to contain a minimum of 110 percent of the storage capacity of the largest tank within the berm. All loading lines would be placed inside the containment berm.

EnCana's existing Orchard Unit Compressor Facility located near Una Bridge would serve the well development planned for the OMDP. If production requirements make onsite compression necessary, a Sundry Notice (Form 3160) would be submitted for approval to the Authorized Officer detailing specifications prior to installation of compressors.

Produced water may be confined to the reserve pit for a period of 90 days after initial production. Produced water at well pads would be transported by truck or buried pipeline to EnCana's existing High Mesa water treatment facility in the South Parachute Field and/or trucked offsite to an approved disposal facility. Condensate would be transported to market by tanker trucks.

Interim Reclamation

After completion activities, EnCana would reduce the size of the well pad to the minimum surface area needed for production facilities and future workovers, while providing for reshaping and stabilization of cut and fill slopes. In brief, interim reclamation would be accomplished by grading, leveling, and seeding, as recommended by the BLM. Interim reclamation would reduce the disturbed area at each pad to approximately 1.5 acres after well development.

The following is a summary of interim reclamation activities that would take place immediately after well completion:

- The well location and surrounding areas(s) would be cleared of all debris, materials, and trash not required for production. Waste and spoil materials would be disposed of at a local landfill.

- All pits, cellars, rat holes and other bore holes not necessary for further lease operations, excluding the reserve pit, would be back-filled immediately to conform to surrounding terrain. Pits, cellars, and/or boreholes required for further lease operations would be fenced.

- Any hydrocarbons in the reserve pit would be removed in accordance with 43 CFR 3162.7. The reserve pit would then be completely dried and all cans, barrels, pipe, etc. would be removed. The accessible portion of pit liner would be removed to the local landfill and the remaining buried part of liner would be backfilled in place with native soils and materials. The backfilling of the reserve pit would be done in such a manner that the mud and associated solids would be confined to the pit and not squeezed out and incorporated into the surface materials. The backfilled pit would be covered with a minimum of 3 feet of overburden. When work is complete, the pit area would support heavy equipment without sinking.

- Areas not necessary for production and future workovers would be reshaped to resemble the original landscape contour. Stockpiled topsoil would be redistributed and disked on the area to be reclaimed and reseeded according to BLM recommendations. In the case of private surface and mineral locations, a seed mixture would be recommended to the landowner.

Interim reclamation would be completed within 90 days from the date of well completion, weather permitting. Dry or non-producing well locations would be plugged, abandoned and reclaimed within 90 days of well completion, weather permitting.

Some locations would require special reclamation practices. These practices could include hydromulching, straw mat application, fertilizing, seedbed preparation, contour furrowing, watering, terracing, water barring, and topsoil replacement. In order to prevent grazing pressure, pads would be fenced for the first two growing seasons or until the seeded species have established.

Workovers or Recompletion

Periodically, the workover or recompletion of a well may be required to ensure that efficient production is maintained. Workovers can include repairs to the well bore equipment (casing, tubing, rods, or pump) the wellhead, or the production facilities. These repairs would usually be completed during daylight hours; however, at times it may be necessary because of restrictions to complete repairs during the night. The frequency of this type of work cannot be accurately projected because workovers vary well by well; for a period of seven to 10 days. In the case of multi-well pads, space for equipment would usually be limited to the "working" (i.e., disturbed) area of the surface location, although it is possible that interim reclamation could be delayed by workover operations.

Abandonment and Reclamation

Well and Pipeline Plugging and Abandonment

Upon abandonment, each borehole would be plugged, capped, and its related surface equipment removed. Subsurface pipelines would be plugged at specific intervals. A Sundry Notice would be submitted by the operator to the BLM that describes the engineering, technical, or environmental aspects of final plugging and abandonment. This notice would describe final reclamation procedures and any mitigation measures associated with the final reclamation performed by the operator. The BLM and Colorado Oil & Gas Conservation Commission (COGCC) standards for plugging would be followed. A configuration diagram, a summary of plugging procedures, and a job summary with techniques used to plug the well bore (e.g., cementation) would be included in the Sundry Notice.

Final Reclamation

All surface disturbances would be recontoured and revegetated in accordance with the GSRA reclamation policy, including control of noxious weeds (USDI 1999b). One of EnCana's goals is to accomplish as much reclamation during the life of the well as possible, even on those pads with a large final reclamation or "in use" area. Unreclaimed areas or reclaimed areas that do not meet the objective of 3 to 4 years of sustained reclamation (i.e., operator complete) would continue to undergo the reclamation retreatment measures described in the 13-Point Surface Use Plan.

EnCana would restore the well locations and access roads to approximately their original contours. During reclamation of these sites, fill material would be pushed into cuts and over the backslope. No depressions would be left that would trap water or form ponds. Upon completion of backfilling, leveling and recontouring, the stockpiled topsoil would be evenly spread over the reclaimed area(s). All disturbed surfaces would be reseeded with a seed mixture approved or recommended by the BLM. The seedbed would then be prepared by disking and roller packing following the natural contours. Seed would be drilled on contours at a depth no greater than 0.5 inch. In areas that cannot be drilled-seeded, seed would be broadcast-seeded at double the seeding rate and harrowed into the soil. All seeding would be conducted

after September 1 and prior to ground frost. Spring seeding would be conducted after the frost leaves the ground but no later than May 15. If the seeding is unsuccessful, EnCana may be required to make subsequent seedings.

Reclamation would be considered successful when the objectives described in the local BLM office reclamation policy are achieved. To summarize these objectives, revegetation would be considered successful when the following objectives are met:

- *Immediate short term*: Establishment of desirable perennial vegetation by end of the second growing season, capable of renewing itself.

- *Acceptable establishment*: Acceptable level of desirable vegetation by the end of the fifth growing season.

- *Long-term establishment*: Level of revegetation approximates the original predisturbed condition, in terms of canopy cover and species composition.

Operator-Committed Mitigation

The approval of the proposed action would result in direct and indirect impacts to wildlife habitat for which mitigation is necessary. Through the impact analysis completed in this EA it was determined that a multitude of mitigative actions would be necessary to prevent a significant impact to wildlife resources. EnCana has proposed a mitigation plan and the BLM and the Colorado Division of Wildlife (CDOW) have worked cooperatively to identify mitigative actions that will be immediately effective and provide long-term relief from impacts associated with the proposed action. The following mitigative actions were identified as necessary to reduce the level of impacts:

- EnCana would place a conservation easement on 160 acres of property which EnCana owns (the "Sunny Side" property) that is located within the boundaries of the OMDP. The conservation easement will be held by an entity other than EnCana. Possible entities include the Colorado Division of Wildlife and the Mesa County Land Trust.

- EnCana would provide funding of up to $60,000 for the purpose of completing habitat treatments, specifically roller chopping, to offset impacts to areas roller chopped as part of the Sand Wash Fuels Treatment program area. This will be completed via a BLM approved contractor and will improve approximately 500 acres of currently decadent sage brush habitat.

- EnCana would provide an additional $60,000 ($20,000 annually beginning in 2008 and ending in 2011) to the BLM for use within the general OMDP area for wildlife habitat improvement. These funds are not tied to a specific project but will be available for use at the BLM's discretion. Options include but are not limited to:
    - Roller chopping areas in which the sagebrush community is decadent to improve big game forage and increase avian use.
    - Conservation easements, other than the one proposed on the Sunny Side property.
    - Water improvement projects to improve range wide use of the landscape and lessen impacts within a specific area by grazing (wildlife and livestock).

The BLM would direct the funding for the above projects. Funds will be dispersed in the most efficient manner to achieve the maximum mitigation. Any and all use of the funds will be solely at the discretion of the BLM, with consultation provided by the CDOW.

Additionally, EnCana has agreed to employ a water distribution system consisting of pipelines (buried within same corridor as gas pipelines) for the purpose of moving produced water offsite. This will help to minimize construction disturbance, truck traffic, dust and other impacts to air quality, as well as impacts to fragile soils and wildlife, all produced water shall be transported from well locations via buried pipelines to a central location, such as a tank battery at the site of an injection well or at a water-handling facility or pad. Pipelines shall be collocated with gas pipelines and roadways whenever possible. Exception to this condition may be granted for exploratory wells located at impractical distances from infrastructure (Appendix D, GJFO No. 27 and GSEO No. 20).

THE NO ACTION ALTERNATIVE

Under the no action alternative, the Applications for Permit to Drill (APDs) associated with the proposed action would be denied and none of the proposed pads, access roads, or pipelines would be developed, and the various rights-of-way required to gain legal access to the area would not be granted.
The selection of the no action alternative would not preclude the development of facilities that have already been approved or occur on private surface. A substantial amount of the OMDP project area has or is currently undergoing development activities that were approved under the Orchard Unit Geographic Area Plan (BLM 2005) and other NEPA documents. There are currently 22 existing well pads and 75 existing wells in the project area. An additional pad (A28OU pad) and 6 associated wells have been approved but not yet developed. Under the no action alternative, production and maintenance of the 75 existing wells will continue into the foreseeable future and the approved A28OU pad and six wells could be developed.

SUMMARY OF LEASE AND GRANT STIPULATIONS

Each of EnCana's Federal oil and gas leases (Figure 3) includes stipulations intended to protect natural resource values. Table 3 provides a summary of lease and grant stipulations that would apply to the proposed action.

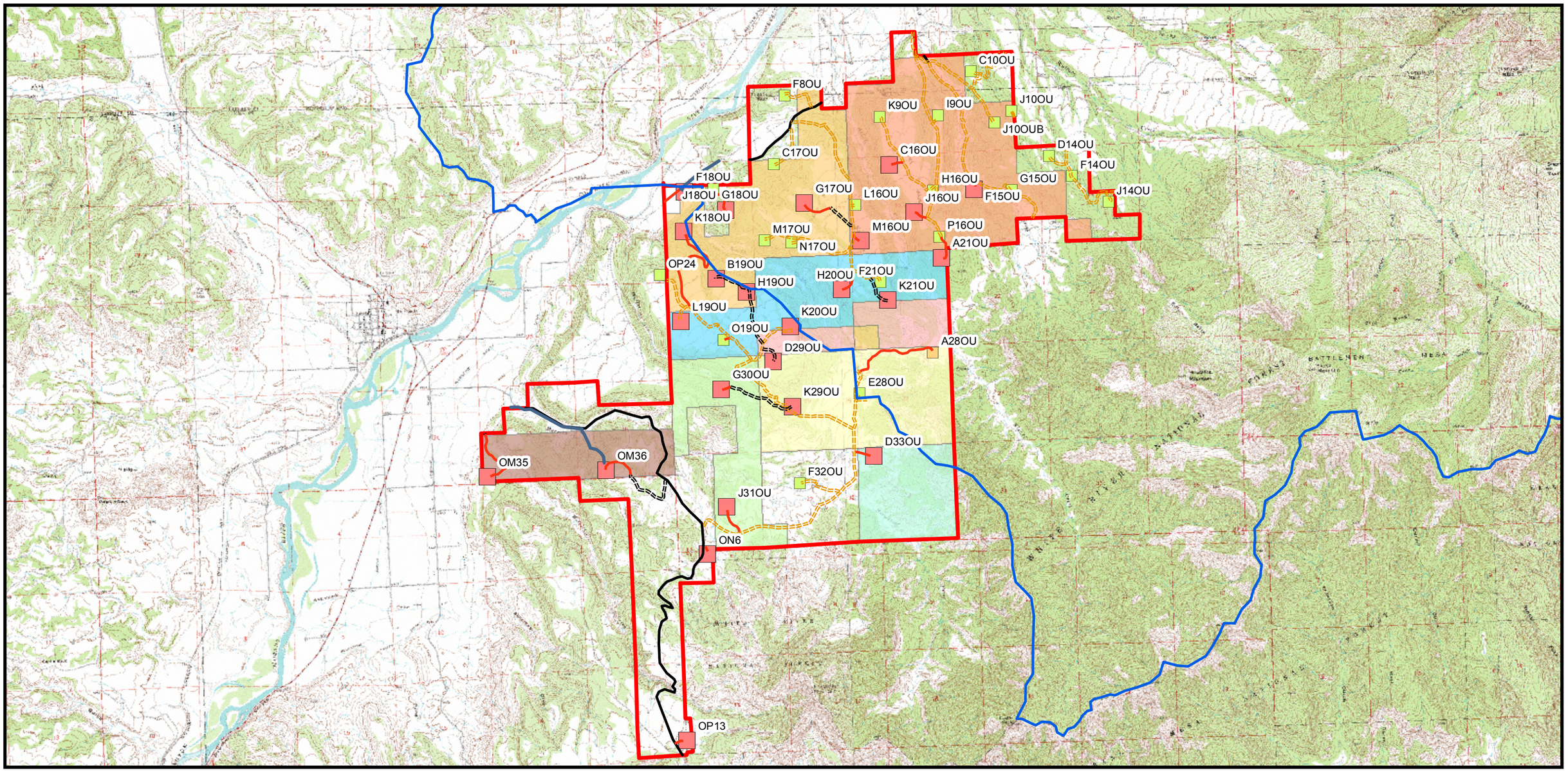
Table 3. Lease Stipulations Applicable to the OMDP.

Lease Number	Description of Lands	Stipulations
COC55198 (1993)	T8S R96W Section 20: S½SW¼	**Controlled Surface Use:** Protection of fragile soils with submittal of plan of development demonstrating performance objectives and standards.
	ALL LANDS within lease	**Lease Notice:** Special biological and/or botanical inventory and special mitigative measures to reduce impacts of surface disturbance to the sensitive plant or animal species may be required. **Lease Notice:** An inventory of fossil resources in Class I and II paleontological areas must be performed by an accredited paleontologist approve by the Authorized Officer.
COC58674 (1995) **Proposed Pad** *C16OU* *F15OU* *J16OU*	T8S R96W Section. 9: SW¼SW¼	**Timing Limitation:** Big Game Winter Habitat (12/1 - 4/30). Exception may be granted under mild winter conditions for the last 60 days of the closure.
	T8S R96W Section 13: E½NE¼, SW¼NE¼ Section 14: NW¼SW¼	**Controlled Surface Use:** Protection of fragile soils with submittal of plan of development demonstrating performance objectives and standards.

Table 3. Lease Stipulations Applicable to the OMDP.		
Lease Number	**Description of Lands**	**Stipulations**
M16OU	ALL LANDS within lease	**Lease Notice:** Special biological and/or botanical inventory and special mitigative measures to reduce impacts of surface disturbance to the sensitive plant or animal species may be required. **Lease Notice:** An inventory of fossil resources in Class I and II paleontological areas must be performed by an accredited paleontologist approve by the Authorized Officer.
COC58675 (1995) **Proposed Pad** *B19OU* *F18OU* *G17OU* *H19OU* *J18OU* *K18OU* *P8OU*	ALL LANDS within lease	**No Surface Occupancy:** No surface use is allowed during 2/1 – 8/15 to protect raptors (including golden eagles, all accipiters, falcons [except kestrels], all buteos and owls) nesting and fledgling habitat during usage for ¼ mile around the nest site. Exceptions may be granted during years when the nest site is unoccupied, when occupancy ends by or after May 15 or once the young have fledged and dispersed from the nest. **No Surface Occupancy:** To protect raptor nests within a 1/8 mile radius from the site. Exception may be granted depending on current usage or on the geographical relationship to topographic barriers and vegetation screening. **Controlled Surface Use:** Protection of fragile soils with submittal of plan of development demonstrating performance objectives and standards. **Timing Limitation:** Big Game Winter Habitat (12/1 - 4/30). Exception may be granted under mild winter conditions for the last 60 days of the closure. **Lease Notice:** Special biological and/or botanical inventory and special mitigative measures to reduce impacts of surface disturbance to the sensitive plant or animal species may be required.
	T8S R96W Section 18: LOTS 3, 4 Section19: LOTS 1, 2	**Controlled Surface Use:** Operations proposed within the area of an approved surface or underground coal mine will be relocated outside the area to be mined or to accommodate room and pillar mining operations. Exception criteria available.
COC58676 (1995) **Proposed Pad** *D29OU* *K29OU*	T8S R96W Section 13: E½SW¼, SW¼SW¼ Section. 28: W½NW¼, SE¼NW¼,SW, W½SE¼, SE¼SE¼ Section 29: ALL	**Controlled Surface Use:** Protection of fragile soils with submittal of plan of development demonstrating performance objectives and standards.
	ALL LANDS within lease	**Lease Notice:** Special biological and/or botanical inventory and special mitigative measures to reduce impacts of surface disturbance to the sensitive plant or animal species may be required. **Lease Notice:** An inventory of fossil resources in Class I and II paleontological areas must be performed by an accredited paleontologist approve by the Authorized Officer.
COC58678 (1995) **Proposed Pad** *G30OU* *J31OU*	ALL LANDS within lease	**Controlled Surface Use:** Protection of fragile soils with submittal of plan of development demonstrating performance objectives and standards. **Lease Notice:** Special biological and/or botanical inventory and special mitigative measures to reduce impacts of surface disturbance to the sensitive plant or animal species may be required.
COC64189 (2000) **Proposed Pad** *D33OU*	T8S R96W Section 33: N½NE¼	**No Surface Occupancy:** To protect threatened or endangered species habitat. Exception Criteria: surface occupancy may be authorized pending Section 7 consultation with USFWS or CDOW (if state-listed). The Authorized Officer will consider the type and amount of surface disturbance, plant frequency and density, relative abundance of habitat, species and location, topography, and other related factors. **No Surface Occupancy:** To protect 14 seclusion areas that provide high wildlife value. Exceptions may be granted based on approval by Authorized Officer of a mitigation plan that suitably addresses the wildlife

Table 3. Lease Stipulations Applicable to the OMDP.		
Lease Number	**Description of Lands**	**Stipulations**
		seclusion values at risk. **No Surface Occupancy:** To protect slopes over 30% with high visual sensitivity in the Interstate 70 viewshed. Exception would be granted if protective measures can be designed to accomplish VRM Class II objectives, namely that the overall landscape character would be retained. **Controlled Surface Use:** For those species listed as sensitive by BLM and for significant natural plant communities, special design, construction, and implementation measures, including relocation of operations by more than 200 meters may be required. **Controlled Surface Use:** To protect erosive soils and slopes greater than 30%, special design, construction and implementation measures will be required to limit the amount of surface disturbance, to reduce erosion potential, to maintain site stability and productivity, and to ensure successful reclamation.
	T8S R96W Section 33: NE¼	**No Surface Occupancy:** No surface use is allowed to protect slopes over 30% with high visual sensitivity in the I-70 viewshed (lands within 5 miles of the interstate). Exception would be granted if protective measures can be designed to accomplish VRM Class II objectives. **No Surface Occupancy:** No surface use is allowed on steep slopes greater than 50% to maintain site stability and site productivity. This NSO does not apply to pipelines. Exception may be granted if lessee demonstrates that operations can be conducted without causing unacceptable impacts and that less restrictive measures will protect the public interest. **Timing Limitation:** Big Game Winter Habitat (12/1 - 4/30). Exception may be granted under mild winter conditions for the last 60 days after consultation with CDOW.
COC64191 (2000) **Proposed Pad** *A21OU* *H20OU* *K20OU* *K21OU* *L19OU*	T8S R96W Section 20: N½NW¼, SE¼NW¼, SW¼NE¼, NW¼SE¼ SEC. 21: N½	**No Surface Occupancy:** To maintain proper function of riparian zones, activities associated with oil and gas exploration and development are restricted to an area beyond the outer edge of riparian vegetation. Exception may be granted (a)if Authorized Officer. Authorized Officer determines that activity will cause no loss of riparian vegetation, or that the vegetation lost van be replaced within 3-5 years with vegetation of like species and age class OR (b) within the riparian vegetation, an exception is permitted for stream crossings, if an area analysis indicates that no suitable alternative is available.
	T8S R96W Section 21: NE¼, NE¼SE¼	**No Surface Occupancy:** To protect 14 seclusion areas that provide high wildlife value. Exceptions may be granted based on approval by Authorized Officer of a mitigation plan that suitably addresses the wildlife seclusion values at risk.
	T8S R96W Section 20: S½NE¼,NE¼SE¼, NE¼NW¼, SE¼NW¼, NW¼SE¼ Section 21: E½NW¼	**No Surface Occupancy:** No surface use is allowed on steep slopes greater than 50% to maintain site stability and site productivity. This NSO does not apply to pipelines. Exception may be granted if lessee demonstrates that operations can be conducted without causing unacceptable impacts and that less restrictive measures will protect the public interest.

Table 3. Lease Stipulations Applicable to the OMDP.		
Lease Number	**Description of Lands**	**Stipulations**
	T8S R96W Section 20: N½, N½S½ Section 21: SW¼NW¼	**No Surface Occupancy:** To protect threatened or endangered species habitat. Exception Criteria: surface occupancy may be authorized pending Section 7 consultation with USFWS or CDOW (if state-listed). The Authorized Officer will consider the type and amount of surface disturbance, plant frequency and density, relative abundance of habitat, species and location, topography, and other related factors. **Controlled Surface Use:** For those species listed as sensitive by BLM and for significant natural plant communities, special design, construction, and implementation measures, including relocation of operations by more than 200 meters may be required.
	T8S R96W Section 21: E½NW¼	**No Surface Occupancy:** No surface use is allowed to protect slopes over 30% with high visual sensitivity in the I-70 viewshed (lands within 5 miles of the interstate). Exception would be granted if protective measures can be designed to accomplish VRM Class II objectives.
	T8S R96W Section 20: N½, N½S½ Section. 21: N½	**Controlled Surface Use:** To protect erosive soils and slopes greater than 30%, special design, construction and implementation measures will be required to limit the amount of surface disturbance, to reduce erosion potential, to maintain site stability and productivity, and to ensure successful reclamation.
	T8S R96W Section 20: N½NW¼, SE¼NW¼, NE¼	**Controlled Surface Use:** Within 500 feet of the outer edge of riparian or wetland vegetation, activities associated with oil and gas exploration and development may require special design, construction and implementation measures, including relocation of operations beyond 200 meters, in order to protect the values and functions of riparian and wetland zones.
	T8S R96W Section 19: E½SW¼, SE¼, Lots 3 and 4	**Timing Limitation:** Big Game Winter Habitat (12/1 - 4/30). Exception may be granted under mild winter conditions for the last 60 days after consultation with CDOW.
COC64197 (2000) **Proposed Pad** *OM35* *OM36*	T8S R97W Section 35: N½S½, S½SW¼, SW¼SE¼	**Scenic & Natural Values:** Special design and reclamation measures may be required to protect the outstanding scenic and natural landscape value of the Highway Corridor. Such measures may include transplanting trees and shrubs, fertilization, mulching, special erosion control structures, irrigation, site recontouring to match the original contour, buried tanks and low profile equipment, and painting to minimize visual contrasts. Surface disturbing activities may be denied in sensitive areas, such as unique geologic features and rock formation, visually prominent areas, and high recreation use areas. This stipulation may be waived or reduced in scope if circumstances change, or if lessee can demonstrate that operations can be conducted without causing unacceptable impacts on the concerns identified.
	T8S R97W Section 35: NE¼SE¼, SW¼SE¼ Section 36: NW¼SW¼	**Steep Slope:** In order to avoid or mitigate unacceptable impacts to soil, water, and vegetation resources on land with greater than 40 percent slopes, special design practices may be necessary and higher than normal costs may result. Where impacts cannot be mitigated to the satisfaction of Authorized Officer, no surface-disturbing activities shall be allowed. This stipulation may be waived or reduced in scope if circumstances change, or if lessee can demonstrate that operations can be conducted without causing unacceptable impacts on the concerns identified.



Legend

- COC 055198
- COC 058674
- COC 058675
- COC 058676
- COC 058678
- COC 064189
- COC 064191
- COC 064197
- OMDP Boundary
- GJFO GSEO Boundary
- Approved Well Pad
- Existing Well Pad
- Proposed Well Pad
- Proposed Pipeline
- Existing Road
- Road Needing Improvement
- New Road
- County Road

Note: Well pads not to scale

N W E S

Prepared by: Wildlife Specialties, L.L.C.
P.O.B. 1231 Lyons, CO 80540
303-710-1286

Figure 3: Federal leases with stipulationswithin the OMDP.

1 inch equals 5,333 feet
Scale: 1:64,000
Contour interval = 40 '
Date: September 2008

BASE: U.S.G.S 7.5 Minute
DeBeque, Grand Valley,
Housetop Mountain, and
Red Pinnacle, Colorado Quadrangles

0 1 2 Miles

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LAND USE PLAN CONFORMANCE REVIEW

The proposed action and no action alternative are subject to and have been reviewed for conformance with the following plans (43 CFR 1610.5, BLM 1617.3):

Name of Plans: Glenwood Springs Resource Area Resource Management Plan (USDI 1984) and Grand Junction Resource Management Plan and Record of Decision (USDI 1987).

Dates Approved: Glenwood Springs Resource Management Plan Amended in November 1991 - Oil and Gas Leasing and Development – Final Supplemental Environmental Impact Statement; amended in March 1999 – Oil and Gas Leasing & Development Final Supplemental Environmental Impact Statement; Grand Junction Resource Management Plan January 29, 1987.

Decision Number/Page: Record of Decision, Glenwood Springs Resource Management Plan Amendment, November 1991, page 3. Record of Decision and Resource Management Plan Amendment, March 1999, page 15. Record of Decision, Grand Junction Resource Management Plan and Record of Decision, January 1987, page ii.

Decision Language: "697,720 acres of BLM-administrated mineral estate within the Glenwood Springs Resource Area are open to oil and gas leasing and development, subject to lease terms and (as applicable) lease stipulations." This decision was carried forward unchanged in the 1999 RMP amendment (USDI 1999a).

The Glenwood Springs Resource Management Plan also directs energy impact analysis be conducted "In areas being actively developed, the operator must submit a Geographic Area Proposal (GAP) that describes a minimum of 2 to 3 years of activity for operator controlled leases within a reasonable geographic area" (USDI 1999a).

The Grand Junction Resource Management Plan and Record of Decision describes management decisions based on geographic pieces of land called emphasis areas (USDI 1987; page 2-33). The OMDP lies within emphasis area Co-2, with an emphasis on oil and gas development. The Grand Junction Resource Management Plan and Record of Decision further states that "Within each emphasis area, the management of a particular resource will be emphasized over all other resources. That is not to say that one resource will be excluded. They will be allowed so long as they are compatible with management of the emphasized resource. Future proposals will be evaluated in the context of the management philosophy of the emphasize area to determine whether the proposal is compatible."

Area Co-2 encompasses approximately 55,248 acres with standard lease terms and 37,051 acres with other stipulations (USDI 1987; page 2-40).

Discussion: The proposed action is in conformance with the 1991 (and 1999) Glenwood Springs RMP amendments and the Grand Junction RMP because the Federal mineral estate proposed for development is open for oil and gas leasing and development. In addition, the proposed action describes a multi-year development plan over a large geographic area and, as such, is in conformance with decision to require operators to submit GAPs.

STANDARDS FOR PUBLIC LAND HEALTH

In January 1997, Colorado BLM approved the Standards for Public Land Health. The five standards cover upland soils, riparian systems, plant and animal communities, threatened and endangered species, and water quality. Standards describe conditions needed to sustain public land health and relate to all uses of the public lands. The environmental analysis must address whether the proposed action or alternatives being analyzed would result in impacts that would maintain, improve, or deteriorate land health conditions relative to these resources. These analyses are presented below.

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section provides a description of the human and natural environment resources that could be affected by the proposed action and no action alternative. In addition, the section presents comparative analyses of the direct and indirect consequences on the affected environment stemming from the implementation of the various actions.

A variety of laws, regulations, and policy directives mandate the evaluation of the effects of a proposed action and alternative(s) on certain critical environmental elements. Not all of the critical elements that require inclusion in this EA are present or, if they are present, may not be affected by the proposed action and alternative (Table 4). Only those mandatory critical elements that are present and affected are described in the following narrative. In addition to the mandatory critical elements, additional resources would be impacted by the proposed action and alternative. These are described in the section titled, **Other Affected Resources.**

Table 4. Critical Elements of the Human Environment.

Critical Element	Present		Affected		Critical Element	Present		Affected	
	Yes	No	Yes	No		Yes	No	Yes	No
Air Quality	X		X		Prime or Unique Farmlands		X		X
ACECs		X		X	Special Status Species*	X		X	
Cultural Resources	X		X		Wastes, Hazardous or Solid	X		X	
Environmental Justice		X		X	Water Quality, Surface and Ground*	X		X	
Floodplains		X		X	Wetlands and Riparian Zones*	X		X	
Invasive Non-native Species	X		X		Wild and Scenic Rivers		X		X
Migratory Birds	X		X		Wilderness and WSAs		X		X
Native American Religious Concerns	X		X						

* Public Land Health Standard

Critical Environmental Elements

Air Quality

Affected Environment

The OMDP is located in a semi-arid (dry and cold), mid-continental climate regime. The area is typical of the western high country with abundant sunshine, low humidity, low rainfall, and cold, snowy winters. The nearest meteorological measurements were collected at Collbran, Colorado (1945-2007) (NCDC 2008), situated approximately 8 miles southeast of the OMDP area, at an elevation of 5980 feet, similar to the mean elevation of mesas in the OMDP.

The annual average total precipitation at Collbran is 15.9 inches and includes an average total snowfall of 47.6 inches. Precipitation is relatively evenly distributed throughout the year. Table 5 shows the mean monthly temperatures and total precipitation for the Collbran station.

Table 5. Mean Monthly Temperatures and Total Precipitation Amounts for Collbran (CO) Weather Station.

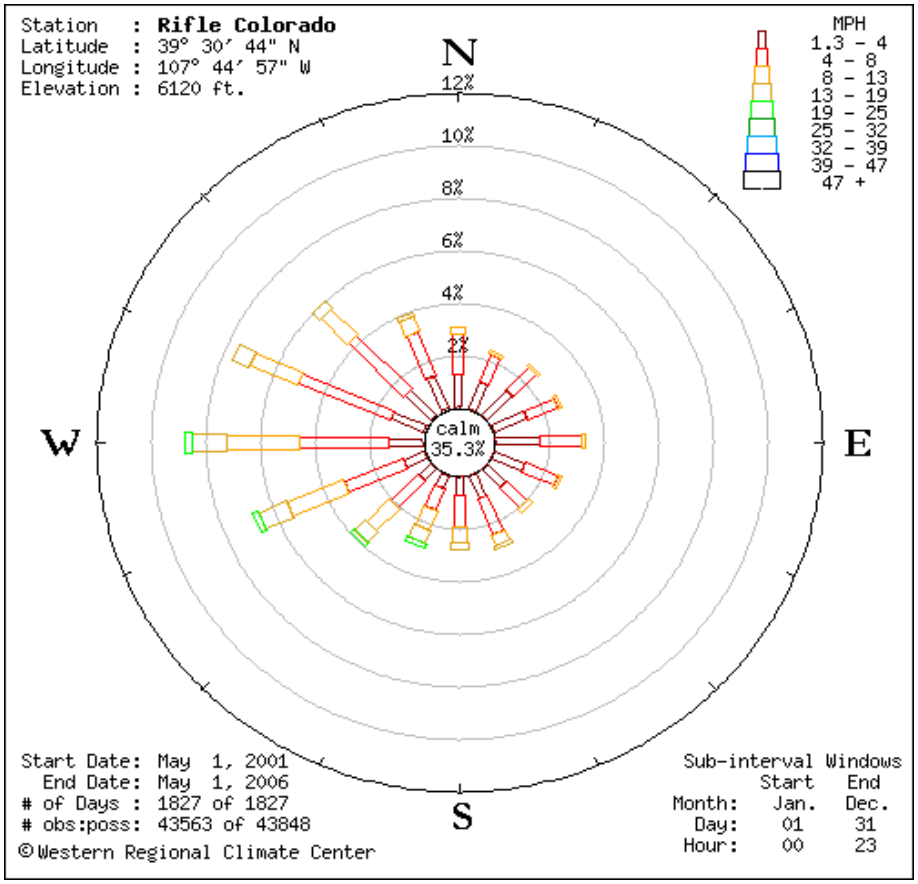
Month	Mean Temperature (°F)	Total Precipitation (inches)
January	24.2	1.0
February	30.1	1.1
March	38.9	1.4
April	46.6	1.6
May	55.5	1.4
June	64.4	0.8
July	70.6	1.2
August	68.4	1.4
September	59.6	1.9
October	48.6	1.6
November	34.7	1.3
December	24.2	0.8
ANNUAL	46.9	15.9
(Annual total differs from sum of monthly values due to rounding)		

Source: NCDC (2008).

The nearest weather station showing wind speed and direction is above Rifle, CO, approximately 18 miles northeast of the OMDP area, and also within the Colorado River Valley. The wind rose on the following page shows the relative frequency of winds at the Rifle weather station (6,120 feet elevation), according to speed class and direction of the wind source. From this information, it is evident that the winds originate from the northwest to southwest about one-third of the time. The annual mean wind speed at Rifle is approximately 4 mph.

The frequency and strength of the winds greatly affect the dispersion and transport of air pollutants. The potential for atmospheric dispersion is generally good, although nighttime cooling enhances stable air, inhibiting air pollutant mixing and transport. Dispersion is most likely along topographic highs such as ridges, mesas, and upper mountain slopes. Table 6 shows the wind speed distribution for the Rifle climate station, from 2001 to 2006.

Wind Rose for the OMDP Area.



Source: WRCC - Rifle, CO, meteorological data collected 2001-2006.

Table 6. Wind Speed Distribution.	
Wind Speed (miles/hour)	**Percent of Occurrence**
0-4.0	16.0
4.0-7.5	40.3
7.5-12.1	26.4
12.1-19.0	13.7
19.0-24.7	2.7
Greater than 24.7	1.0

Source: WRCC 2006 - Rifle, CO meteorological data collected 2001-2006.

The Colorado Ambient Air Quality Standards (CAAQS) and National Ambient Air Quality Standards (NAAQS) are health-based criteria for the maximum acceptable concentrations of air pollutants at all locations to which the public has access. Although specific air quality monitoring has not been conducted in-field, regional air quality monitoring has been conducted near the study area. Air pollutants measured in the region for which ambient air quality standards exist include: carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter less than 10 microns (μ) in effective diameter (PM_{10}), particulate matter less than 2.5 μ in effective diameter ($PM_{2.5}$), and sulfur dioxide (SO_2). Background pollutant concentrations for these pollutants are compared to the CAAQS and NAAQS in Table 7.

As shown in Table 7, regional background values are well below established standards, and all areas within the cumulative study area are designated as attainment for all criteria pollutants.

The Roan Plateau RMPA and EIS describe potential effects from oil and gas development (USDI 2006:4-26 to 4-37). Analysis was completed with regard to greenhouse gas emissions, a near-field and far-field analysis for carbon monoxide, particulate matter (PM_{10} and $PM_{2.5}$), sulfur dioxide, hazardous air pollutants including: benzene, ethylbenzene, formaldehyde, hydrogen sulfide, toluene, and xylenes. Sulfur and nitrogen deposition analysis, acid neutralizing capacity, and visibility screening-level analysis were also completed in the Roan Plateau RMPA and EIS. Findings indicate that no adverse long-term effects would result under that plan. Since the proposed action is within the scope of the reasonable foreseeable development (RFD) scenario analyzed in that document, it is anticipated that the proposed action would be unlikely to have adverse effects on air quality.

Activities described in the proposed action would result in localized short-term increases in vehicle and equipment emissions and fugitive dust generation. Concentrations of emissions would be below applicable ambient air quality standards as analyzed in the Roan Plateau RMPA & EIS.

Federal air quality regulations adopted and enforced by Colorado Department of Public Health and Environment (CDPHE) limit incremental emissions increases to specific levels defined by the classification of air quality in an area. The Prevention of Significant Deterioration (PSD) Program is designed to limit the incremental increase of specific air pollutant concentrations above a legally defined baseline level. Incremental increases in PSD Class I areas are strictly limited, while increases allowed in Class II areas are less strict.

The project area and surrounding areas are classified as PSD Class II. The PSD Class I areas located within 100 miles of the project area are Flat Tops Wilderness (approx. 50 miles NE), Maroon Bells – Snowmass Wilderness (approx. 50 miles SE), West Elk Wilderness (approx. 55 miles SE), Black Canyon of the Gunnison National Park (approx. 40 miles S), Eagles Nest Wilderness (approx. 80 miles E), and Arches National Park (approx. 70 miles SW). Dinosaur National Monument (approx. 80 miles NW) is listed as a Federal Class II area but is regulated as a Class I area for SO_2 by CDPHE. These sensitive areas have the potential to be impacted by cumulative project source emissions. Regional background pollutant concentrations and NAAQS, CAAQS, and PSD Class I and II Increments are also presented in Table 7.

CDPHE, under their EPA-approved State Implementation Plan, is the primary air quality regulatory agency responsible for determining potential impacts once detailed industrial development plans have been made, and those development plans are subject to applicable air quality laws, regulations, standards, control measures, and management practices. Therefore, CDPHE has the ultimate responsibility for reviewing and permitting the project prior to its operation. Unlike the conceptual "reasonable, but conservative" engineering designs used in NEPA analyses, any CDPHE air quality preconstruction permitting demonstrations required would be based on very site-specific, detailed engineering values, which would be assessed in the permit application review.

Table 7. Air Pollutant Background Concentrations, Colorado and National Ambient Air Quality Standards, and Prevention of Significant Deterioration (PSD Increments (µg/m^3)).				
Pollutant/Averaging Time	**Measured Background Concentration**	**Colorado and National AAQS**	**Incremental Increase Above Legal Baseline PSD Class I/ II**	
Carbon Monoxide (CO) [1]				
1-hour	1,145	40,000	n/a	n/a
8-hour	1,145	10,000	n/a	n/a
Nitrogen dioxide (NO_2) [2]				
Annual	9	100	2.5	25
Ozone [3]				
1-hour	173	235	n/a	n/a
8-hour	145	157		
Particulate Matter (PM_{10}) [1]				
24-Hour	41	150	8	30
Annual	11	50	4	17
Particulate Matter ($PM_{2.5}$) [4]				
24-Hour	18	65	n/a	n/a
Annual	8	15	n/a	n/a
Sulfur dioxide (SO_2) [5]				
3-hour (NAAQS)	24	1,300	25	512
3-hour (CAAQS)	24	700	25	512
24-hour (NAAQS/CAAQS)	13	260	5	91
Annual (NAAQS/CAAQS)	5	80	2	20

[1] Background data collected at American Soda, Piceance 2003-2004 (CDPHE 2006).

[2] Background data based on a rural default that is based on Southern Ute stations near Ignacio (CDPHE 2006).

[3] 1-hour ozone based on Mesa Verde, 2003 data. 8-hour ozone based on CASTNET in Mesa Verde, Canyonlands, and Gothic (CDPHE 2006).

[4] Background data collected at 515 Patterson, Grand Junction, CO (CDPHE 2006).

[5] Background data collected at Unocal 1983-1984 (CDPHE 2006).

Environmental Consequences

Proposed Action:

If fully developed, the 12,067-acre OMDP proposal will result in construction of 24 new well pads and reactivation of one existing well pad; construction of up to 5.4 miles of new access roads and the improvement of 3 miles of existing two-track routes; and approximately 15.1 miles of pipelines. Surface facilities at each well pad location would consist of wellheads, separation/dehydration units, and aboveground condensate and produced water tanks with approximately 300- to 400-barrel capacities. Pending approval, EnCana expects to drill up to 35 of the proposed wells in 2009 and an equal or greater number per year in subsequent years, up to a maximum of 93 wells. The project does not include construction of any compressor stations; EnCana's existing Orchard Unit Compressor Facility located near Una Bridge is expected to serve the well development planned for the OMDP. Construction activities for each well pad would take place during the hours of 7:00 a.m. and 6:00 p.m. Construction of each pad, plus associated access road and pipeline, is anticipated to take up to 5 or 6 weeks, with each individual activity lasting approximately 2 weeks.

Air quality would decrease during construction of the OMDP wells due to pollutants generated from drilling and well pad construction. Once construction activities are complete, air quality impacts associated with these activities will also cease. Drill rig operations would result mainly in an increase of

NO_x and CO emissions due to combustion, plus fugitive dust associated with construction equipment and vehicles. It is estimated that each well would require about 12 days to drill and 30-40 days to complete. For the 93 wells in this OMDP, this would add up to approximately 3900 to 4850 drilling and completion days. This level of activity would most likely require approximately four drilling rigs to be operational within the OMDP at any one time, with each rig in operation about 40% of the time during drilling operations.

Table 8 provides the annual estimated emission rates from OMDP drilling activities, assuming that each drilling rig generates a total of about 2600 horsepower (hp) based on four engines: two at 800 hp and two at 500 hp. These calculations do not include emissions from completion or workover rigs. EPA Tier I emission factors for the drill rigs were used to identify the largest potential impacts. However, based on drill rig availability and contracting, the drill rigs used may satisfy Tier II standards.

Table 8. Potential Emissions from Drilling Activities.

Source	Pollutant	Emission Factors (lb/hp-hr)	Yearly Hours of Operation	Annual Emissions (tons/year)	Reference[1]
Four 2600 hp drill rigs	NO_x	0.0057	3571	105.9	Tier I
	CO	0.0090	3571	167.2	Tier I
	VOCs	0.0004	3571	7.4	Tier I
	PM_{10}	0.00033	3571	6.1	Tier I
	$PM_{2.5}$		3571	0.9	EPA PM_{10} multiplier

[1] Tier I standards were taken from 40 CFR Part 9. The PM_{10} multiplier used to estimate PM2.5 emissions is 0.15 (AP-42, Section 13.2.2).

EnCana anticipates that it will have a Tier II-compliant drilling rig fleet by the year 2012, which will reduce these emissions by 20% or more. However, included in the conditions of approval is a requirement that the drilling rigs used in the OMDP reach Tier II-compliance at the earliest feasible date. If Tier II compliance is accomplished at the start of OMDP operations, a reduction in NO_X, CO, VOC, and PM_{10} emissions by 20% is possible.

The anticipated air impacts associated with well pad construction and drilling are limited in duration and are anticipated to be minor sources. The emissions from drilling are not anticipated to impact any of the Class I areas. These activities are also not anticipated to exceed any ambient air quality standards.

After the development phase is complete, the operation of the proposed OMDP wells would primarily produce emissions from the following sources:

- Production unit heaters, condensate storage tanks, and glycol dehydrator still vents located at the well pads
- Vehicle tailpipes
- Road dust from operations and maintenance vehicles

Once the wells are completed, ancillary equipment will be installed at each well pad associated with production and operation. Based on EnCana's facilities elsewhere in the GSEO project area, this equipment will consist of, on average, three 300 bbl condensate tanks, several water pumps, and three small heaters associated with the separators. The pumps are anticipated to be small (100 hp or less) units and will be used to move water from the sites. Similarly, the separators will include fairly small 500 to 1000 BTU/hr heaters. The emissions from the pumps and heaters are anticipated to be negligible. The calculated emissions from condensate tanks assume that 15 bbl/day of water will be produced from each well and that approximately 10% of the produced water will be separated into condensate.

The air impacts associated with the condensate tanks at each well pad are anticipated to be minor. However, volatile organic compound (VOC) emissions are dependent on the characteristics of the condensate, tank operations, and production. If VOC emissions need to be reduced, a vapor recovery or thermal destruction system can be installed that can effectively reduce VOC emissions by 95%. Once site-specific production information is available, emission estimates can also be refined using the TANKs model and extended fuel analyses.

During well development, increased tailpipe emissions of NO_x and CO would result from vehicles transporting workers to and from work sites and from the transportation and operation of construction equipment. Fugitive dust concentrations would increase with vehicle traffic on unpaved roads and from wind erosion in areas of soil disturbance, and would likely produce high levels of dust in dry conditions in the absence of dust abatement. To mitigate dust generated by vehicle use, EnCana will be required to implement dust abatement strategies as needed by watering the access road and construction areas or applying a suppressant approved by the Authorized Officer (Appendix D, GJFO No. 8 and GSEO No. 2).

Total estimated emissions for the Proposed Action are summarized in Table 9. Emissions resulting from well development activities can be categorized into three distinct phases: well pad, pipeline, and access road construction; well drilling; and well completion. With the exception of CO, these calculations are based on the estimated emissions in the Orchard Unit GAP (OUGAP – BLM 2005) EA, adjusted for the larger number of wells associated with the OMDP. CO concentrations from construction and well development were adjusted based on data from Table 9. OUGAP emission rates were calculated using applicable EPA emission factors and anticipated level of operational activities, such as estimated vehicle trips, load factors, and hours of operation.

Table 9. Proposed Action Emission Summary.

Pollutant	Construction and Well Development (tons/year)	Operations[1] (tons/year)				
		Production Heaters	Condensate Tank Flash	Well Pad Dehydration	Operations Vehicles	Total Operations
NO_X	242.1	8.7	0.0	0.0	0.0	8.7
CO	382.2	7.4	0.0	0.0	0.6	8.0
VOCs	14.7	0.1	509.2	39.8	0.0	549.1
SO_2	4.1	0.0	0.0	0.0	0.0	0.0
PM_{10}	220.3	0.7	0.0	0.0	36.3	37.0
$PM_{2.5}$	38.2	0.7	0.0	0.0	5.6	6.3
Benzene	0.0	0.0	2.4	5.4	0.0	7.8
Toluene	0.0	0.0	0.0	7.9	0.0	7.9
Ethylbenzene	0.0	0.0	0.0	0.6	0.0	0.6
Xylene	0.0	0.0	0.0	4.0	0.0	4.0
n-Hexane	0.0	0.1	7.2	1.7	0.0	9.0
Formaldehyde	0.1	0.0	0.0	0.0	0.0	0.0

[1] Annual emissions associated with full-field development after construction

Since the current land use plan was approved, ongoing scientific research has identified the potential impacts of "greenhouse gases" (GHGs) and their effects on global atmospheric conditions. These GHGs include carbon dioxide, methane, nitrous oxide, water vapor, and several trace gases. Through complex interactions on a global scale, these GHG emissions are believed by some to cause a net warming effect

of the atmosphere primarily by decreasing the amount of heat energy radiated by the Earth back into space.

In 2001, the Intergovernmental Panel on Climate Change (IPCC) predicted that by the year 2100, global average surface temperatures would increase 1.4 to 5.8°C (2.5 to 10.4°F) above 1990 levels. The National Academy of Sciences (2006) supports these predictions, but has acknowledged that there are uncertainties regarding how climate change may affect different regions. In 2007, the IPCC also concluded that "warming of the climate system is unequivocal" and "most of the observed increase in globally average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic [man-made] greenhouse gas concentrations." Other theories about the effect of GHGs on global climate change exist.

The assessment of GHG emissions and climate change remains in its formative phase; therefore, it is not yet possible to know with certainty the net impact to climate from GHGs produced globally over the last century or from those produced today. The lack of scientific tools designed to predict climate change on regional or local scales limits the ability to quantify potential future impacts of climate change on the specific area of the proposed action. In addition, while any oil and gas leasing or development projects may contribute GHGs to the atmosphere, these contributions would not have a significant effect on a phenomenon occurring at the global scale believed by some to be due to more than a century of human activities.

No Action Alternative

The no action alternative would impact the air quality in similar ways to the proposed action. Well pad, road, and pipeline construction and well drilling would still occur on adjacent lands so there would still be temporary fugitive dust and combustion emissions associated with construction equipment, drilling rigs, and vehicles. Once the wells are installed, the air impacts are anticipated to be small to negligible and would include emissions from condensate tanks, separator heaters, and pumper traffic. In general, the air impacts of the no action alternative would be less than the proposed action, but would include similar types of emissions and sources.

Cultural Resources

Affected Environment

Section 106 of the National Historic Preservation Act (P.L. 89-665; 80 Stat. 915; 16 U.S.C. 470) and its implementing regulations found at 36 CFR Part 800 requires Federal agencies to take into account the effects their actions will have on cultural resources for any endeavor that involves Federal monies, Federal permitting or certification, or Federal lands. Because of this, consideration of the environmental consequences of the proposed action extends to all proposed actions within the OMDP, whether the surface ownership is Federal or private.

Within the OMDP, 52 cultural resource investigations have occurred covering proposed wells, access roads, pipelines, range improvement projects, seismic exploration, electric transmission lines, a wickiup study area, a wildland-urban interface fuels reduction study area, mill tailings disposal sites, a fire rehabilitation area, and an evaporation pond (Table 10). Because the Glenwood Springs Field Office (GSFO) is the lead agency for the OMDP study, projects that span the boundary between that field office and the Grand Junction Field Office (GJFO) are listed by their GSFO project numbers where possible. Projects conducted solely within the GJFO are listed with their GJFO project numbers where possible and highlighted with an asterisk. One project (#1180-34) appears to have been restricted to the GSFO, but the only project number available was from report submitted to the GJFO. One project was not depicted in

either the GSFO data or on the USGS quadrangles copied at the GJFO. This project is listed by its Office of Archaeology and Historic Preservation (OAHP) project number.

Table 10. Cultural Resource Investigations in the OMDP Study Area.					
S356	1179-23*	1107-16	5405-02*	5406-02	5600-01
S591	1180-34*	1108-03	5405-05	5406-03*	14506-01
S791	1185-09*	4476-14*	5405-07	5406-04	14604-01
S883	1195-09*	5403-1	5405-12	5406-34*	15303-01*
S902	1102-01	5403-3	5405-14	5407-02	15007-01
	1078-15*	1102-14*	5404-1	5405-18	5407-10
MC.LM.R247	1082-43*	1107-01	5404-02	5405-25	5407-10A
ME.LM.NR437	1083-19*	1107-11	5404-03	5405-27	5407-11
	1084-06*	1107-12	5404-06*	5406-01	5407-19

*Grand Junction Field Office number

Two cultural resource inventories (5407-10 and 10A-GSFO) were conducted specifically for the OMDP. Approximately 1,628 acres were surveyed and 48 cultural resources were identified in those two inventories. Additionally, one these studies was a Class I study (5407-11) that was required since access to conduct a Class III inventory on private land for two proposed well and access developments (unrelated to the OMDP) was denied. Another of the projects in the OMDP study area (1107-01) was an excavation project with the goal of mitigating the effects of inadvertent construction impacts at site 5ME12825.

The acreage investigated by the Class III inventories amounts to 4358 acres, or 36.5% of the OMDP study area. The majority of this acreage (±90%) was inventoried on or after 2000 and is considered adequate by current standards.

The OMDP study area includes 292 recorded cultural resources. Two additional resources of value in assessing the proposed action's potential effects are outside the study area, but within 100 meters of it. Of these 294 resources 38 (12.9%) are sites eligible or potentially eligible for inclusion on the National Register and are considered to be "historic properties." Forty-four (15.0%) are sites that are not eligible and 211 (71.8%) are isolated finds. One site is a linear resource with an ambiguous eligibility assessment: the historic Bluestone Valley Ditch in Garfield County is potentially eligible, while the same ditch becomes not eligible immediately after crossing into Mesa County. Historic properties within the OMDP study area include: one historic farmstead, 18 prehistoric open camps, one prehistoric/historic multi-component camp, two prehistoric sheltered camps, 12 open architectural sites, and four open lithic scatters.

In addition to recorded cultural resources, the possible historic route of the Dominguez-Escalante Expedition also passes through the OMDP study area. This trail is shown in archival documents and represents a significant event in regional history. No physical evidence of the expedition's route has been found, so it cannot be considered a historic property. The trail's possible route through the OMDP is of interest.

Environmental Consequences

Proposed Action

The proposed action has some potential to affect cultural resources identified in the OMDP study area. For archaeological sites, direct impacts result primarily from disturbance of surface and subsurface sediments. For historic properties with Protohistoric or Historic period structural remains, direct impacts

result from damage to or destruction of these structures. Direct impacts are generally concentrated in the development phase of the proposed action, though they can happen any time the ground is subject to alteration. As currently planned, the proposed action may have direct impacts to known historic properties. More specifically, the proposed OM-35 well and access development, if included in the proposed action, will adversely affect a historic property (5ME15636). If this is the case, a plan for mitigation of adverse effect to this site will need to be prepared and a new consultation will have to be done with the SHPO to address the effect of the project on this resource.

Additionally, direct impacts to known cultural resources will and have occurred within the OMDP area, and there is also potential for impacts to as yet undiscovered resources. Excavations to mitigate impacts from an inadvertent construction trespass at one site found at least four periods of Holocene aeolian deposits spanning approximately 6,500 years (Martin et al. 2006), suggesting that construction of the proposed action has at least some potential to impact resources that lack surface manifestations. The potential for this occurrence is thought to be moderate to low.

The 44 sites evaluated as not eligible and the 211 isolated finds are not considered historic properties and avoidance was not required, as recording was deemed to fulfill the intellectual information inherent in these resources. Strict adherence to the Education/Discovery Condition of Approval (COA) by EnCana and all of their subcontractors should help mitigate any potential occurrence of adverse impacts to historic properties (Appendix D, GJFO No. 26, GSEO Nos. 3 & 4).

Proximity of the proposed action to cultural resources may in fact adversely impact their significance by changing the setting, location, association, and feeling of area. This is particularly true for culturally sensitive cultural sites and/or areas of concern. Within the OMDP study area, there are two such sites that may be affected by this type of impact. In addition, there are 10 historic properties in the study area with Protohistoric or Historic Period structural remains for which impacts in the vicinity would adversely affect significance.

The proposed action will alter the environmental setting of the project area. It will also affect access to the lands within the OMDP area, primarily by providing new roads and thus new and/or easier access. These changes may not be quantifiable at the level of individual sites, but the cumulative effects of these changes over time and over the entire OMDP area will result in degradation of the condition and integrity to most sites due to the potential for increased surface collection, increased casual travel (which may physically impact sites), and to the integrity of setting, location, association, and feeling for which the surrounding landscape is a part of the site's significance. This is especially true for a number of open architectural sites in the study area. Mitigation measures designed to reduce these types of impacts are presented in Appendix D (GJFO No. 26, GSEO Nos. 3 & 4).

All land to be developed by the proposed action was subjected to Class III inventory. No formal consultation was initiated with the SHPO for the Class III inventories, as EnCana agreed to avoid all historic properties identified during the inventories by various methods, including rerouting and/or relocation of facilities, or cancellation of proposed developments. Based on no comment from the SHPO after BLM submitted the information letter for the project with the findings of the Class III inventories, and based on the proposed developments included in this EA, the BLM made a determination that EnCana's proposed action would have a "no adverse effect on historic properties" within the OMDP. This determination was made in accordance with the 2001 revised regulations [36CFR 800.4(d)(1)] for Section 106 of the National Historic Preservation Act (16U.S.C 470f), the BLM/SHPO Programmatic Agreement (1997) and Colorado Protocol (1998)].

No Action Alternative\:

Under the no action alternative, the Applications for Permit to Drill (APDs) associated with the proposed action would be denied and none of the proposed pads, access roads, or pipelines would be developed, and the various rights-of-way required to gain legal access to the area would not be granted. As a consequence, both known and undiscovered Native American resources would be more protected and the potential degradation of site condition and integrity would be reduced or eliminated. Additionally, the information gleaned from the Class III inventories would not have been added to the cultural resource data base thereby reducing the information from which cultural resource land managing decisions are based.

Invasive Non-native Species

Affected Environment

No large populations of invasive non-native species were observed within the OMDP project area. However, cheatgrass *(Anisantha tectorum*), a List C noxious weed*,* is prevalent throughout the understory of the pinyon-juniper (*Pinus edulis-Juniperus osteosperma*) woodlands and in many areas of sagebrush (*Artemisia tridentata*) shrublands, greasewood (*Sarcobatus vermiculatus*) shrublands, and salt-desert shrublands. Less common noxious weeds include tamarisk *(Tamarix parviflora),* redstem filaree *(Erodium cicutarium),* and Russian olive *(Elaeagnus angustifolia)*, List B noxious weeds; and field bindweed *(Convolvulus arvensis)*, and halogeton *(Halogeton glomeratus)*, List C noxious weeds. Other invasive weeds found in the OMDP project area include bur buttercup *(Ceratocephala orthoceras*), horehound (*Marrubium vulgare*), alyssum *(Alyssum desertorum),* tumble mustard (*Sisymbrium altissimum*), and clasping pepperweed (*Lepidium perfoliatum*). Dispersal mechanisms of noxious weed species vary. Species such as cheatgrass are dispersed by wind and by attachment to animal fur or human clothing. Other species such as clasping pepperweed and redstem filaree appear to be dispersed mainly by wind. However, all of the species have the potential to be transported by heavy machinery, earthmoving equipment, and personnel vehicles.

Environmental Consequences

Proposed Action

Noxious weed populations are a threat to land health as they contribute to loss of rangeland productivity, increased soil erosion, reduced species richness, reduced wildlife habitat quality, and reduced aesthetic quality. Surface-disturbing activities create conditions favorable for the invasion and establishment of noxious weeds and other invasive non-native species, particularly when these species are already present in the surrounding area. In addition, heavy machinery and vehicles used by oil and gas personnel have the potential to transport weed seed from other areas. Although no large populations of noxious and invasive weeds (with the exception of cheatgrass) are present in the OMDP project area, they may be present in adjacent oil and gas development areas. Therefore, the potential risk for weed invasion following construction is high. Mitigation measures designed to minimize the spread of invasive non-native species are presented in Appendix D (GJFO No. 19, GSEO Nos. 7 & 17).

No Action Alternative

Under the no action alternative, the Applications for Permit to Drill (APDs) associated with the proposed action would be denied, and none of the proposed pads, access roads, or pipelines would be developed. However, the selection of the no action alternative would not preclude the development of facilities that have already been approved or occur on private surface. A substantial amount of the OMDP project area

has or is currently undergoing development activities that were approved under the Orchard Unit Geographic Area Plan (BLM 2005) and other NEPA documents. There are currently 22 existing well pads and 75 existing wells in the project area. An additional pad (A28OU pad) and 6 associated wells have been approved but not yet developed. Continued operations and maintenance activities associated with the existing 22 pads and 75 associated wells would present a continued potential source of weed introductions.

The potential risk for weed invasion would be much less under the no action alternative than under the proposed action. The no action alternative would only include 9.2 acres of new ground disturbance associated with the A28OU well pad permitted under the Orchard Unit Gap (BLM 2005a) whereas the proposed action includes 235.6 acres of new ground disturbance for 24 proposed pads, 8.36 miles of new ground disturbance for new or improved roads, and 15.11 miles of ground disturbance for proposed pipelines.

Migratory Birds

Affected Environment

The OMDP project area is comprised primarily of pinyon-juniper woodlands intermixed with mountain shrub and sagebrush covered plateaus. This diversity of habitat types provides cover, forage, and nesting habitat for a variety of migratory birds.
According to the Southern Rockies/Colorado Plateau Birds of Conservation Concern (BCC) list (USFWS 2002) and the Colorado Breeding Bird Atlas (Colorado Bird Atlas Partnership 1998), five species of conservation concern--the gray vireo (*Vireo vicinior*), pinyon jay (*Gymnorhinus cyanocephalus*), black-throated gray warbler (*Dendroica nigrescens*), Virginia's warbler (*Vermivora virginiae*), and sage sparrow (*Amphispiza belli)*—could occur in the project area. All of these species have been observed within and around the project area. Other species that are not on the BCC list but closely tied to pinyon-juniper habitats include residents such as the juniper titmouse (*Baeolophus griseus*) and Townsend's solitaire (*Myadestes townsendi*) and migrants such as the common poorwill (*Phalaenoptilus nuttallii*), gray flycatcher (*Empidonax wrightii*), and blue-gray gnatcatcher (*Polioptila caerulea*).

Nesting habitat for raptors such as the red-tailed hawk (*Buteo jamaicensis*), Cooper's hawk (*Accipiter cooperi*), and sharp-shinned hawk (*Accipiter striatus*) is present throughout the project area, frequently within riparian drainages such as Alkali and Little Alkali creeks, but also in juniper-dominated upland habitats (Wildlife Specialties 2006). Suitable nest sites include but are not limited to mature deciduous and coniferous riparian trees, large pinyon pines, and junipers. In addition to nesting habitat, the project area provides suitable foraging habitat for raptors including the red-tailed hawk, Cooper's hawk, northern harrier (*Circus cyaneus*), and great horned owl (*Bubo virginianus*). Forest openings and adjacent forested areas provide suitable nest locations for a ground-nesting raptor, the northern harrier, as well as the common nighthawk (*Chordeiles minor)*(not a raptor) and vesper sparrow (*Pooecetes gramineus*).

Sagebrush-covered plateaus provide nesting and foraging habitat for a variety of species including the vesper sparrow, lark sparrow (*Chondestes grammacus*), and Brewer's sparrow (*Spizella breweri*). Of these, the Brewer's sparrow is a sagebrush obligate. The results of two recent habitat assessments and raptor surveys (July and August 2006 and April – May 2007) indicate that one active nest was located within a 0.25-mile radius of the proposed developments at pad OM35 (Wildlife Specialties 2007), and two historic nest sites were located along Alkali and Little Alkali Creeks. As noted above, however, the remainder of the project area also offers suitable foraging and nesting habitat for a variety of raptor species (Wildlife Specialties 2006, 2007).

Previous oil and gas development activities include the development or approval of 35 well pads (77.6 acres), improving 10.2 miles of access roads (31.4 acres), 2.6 miles of semi improved two-track road (18.7 acres), 7 miles of new roads (15.3 acres) and 20.6 acres of pipelines not collated with roads has occurred across 5,320 acres of the project area. Of these 5,320 acres, 80% (4,300 acres) is pinyon-juniper woodland, approximately 18% (957 acres) sagebrush, and approximately 2% (106 acres) shrublands (USDI 2005a). These past impacts represent a loss of 52.69 acres (0.01%) of pinyon-juniper woodlands (18.32 acres long term), 29.57 acres (<0.01%) of juniper-sagebrush mix (12.85 acres long term), 50.3 acres (0.05%) of sagebrush (27.45 acres long term), and 3.47 acres (0.03%) of shrublands (2.53 acres long term).

BLM Instruction Memorandum No. 2008-050 provides interim guidance to enhance coordination and communication toward meeting the BLM's responsibilities under the MBTA and Executive Order 13186. This guidance includes avoiding migratory bird habitat and placing timing limitations on lands where nesting may occur.

The Colorado Oil and Gas Conservation Commission and the USFWS have a Memorandum of Understanding migratory bird policy (COGCC 2007). This policy requires all oil and gas operators to install screening or other devices on the stacks and on other openings of heater-treaters or fired vessels to prevent entry by migratory birds. This also requires all oil and gas operators to install appropriate netting or fencing to prevent access to pits by wildlife.

Environmental Consequences

Proposed Action

The proposed action would result in the development of 24 new well pads and associated roads and pipelines in predominantly undisturbed avian habitat, causing the direct loss of a maximum of 351.3 acres currently available for foraging and nesting. The greatest amount of habitat loss would occur within the sagebrush community. Although interim reclamation would provide some benefits, a long-term loss of woodland and sagebrush nesting habitat is likely where these habitat types are affected. Species would be affected through the direct loss of habitat and the breaking up of habitats into smaller parcels (Fahrig 2003). Species closely tied to large, contiguous patches of habitat (e.g., black-throated gray warbler) could experience decreased productivity resulting from increased nest predation and parasitism as habitats become fragmented. Habitat generalists (e.g., brown-headed cowbird (*Molothrus ater*)) would likely benefit from the increased habitat edge associated with the proposed action.

Development impacts associated with the proposed action would occur in all habitat types across the landscape. Habitat types were defined based on a truncation of classifications in table 13. Habitat types were revised from classification in table 13 as follows; woodlands and mixed woodlands remained unchanged, 36.2% and 29.1% of the project area respectively; shrublands classification was broken into two separate groups, sagebrush (25.8%) and shrublands (4.9%). The shrublands classification consists of shadscale/saltbush community, greasewood flats, and disturbed rangeland. The riparian areas classification was changed to riparian woodlands, encompassing cottonwood and coniferous riparian forests (0.1%). The remaining riparian habitats were classified as riparian shrublands (1.6%). The classification for unvegetated habitats (2.2%) remained unchanged.

The development of well pads under the proposed action would impact 35.5 acres (0.8%) of the 4,370.52 acres of woodlands in the short term and 9.5 acres (0.2%) over the long term. Impacts to mixed woodlands would affect 29.8 acres (1.0%) over the short term and 7.5 acres (0.26%) over the long term. Impacts to sagebrush habitats (3,115.47 acres) over the short term would encompass 59.7 acres (1.9%) and 18 acres (0.5%) over the long term. Impacted shrubland habitats would include 4.6 acres out of a

total of 529.91 acres (0.8%). Impacted shrubland habitats would be restricted to the greasewood flats type.

In addition to impacts from proposed well pads, the development of roads and non-collated pipelines would also occur. The proposed action includes the development of 8.8 miles of roads and 15.5 miles of pipelines, 1.7 miles of which would not be collated with roadways. Short-term and long-term impacts to woodland habitats would encompass 39 (0.9%) and 11 (0.3%) acres respectively. Mixed woodland habitats cover approximately 3,513 acres, 2,935 acres of which are located in the juniper/sagebrush mix and pinyon-juniper sagebrush mix habitats. Within this habitat type, 23 acres (0.8%) would be impacted in the short term. Long-term impacts within this habitat would affect 7 acres (0.2%). Impacts would also occur across 43 acres (1.4%) of sagebrush habitats in the short term and 10 acres (0.3%) over the long term. Shrubland habitats impacted in the short term by roads and non-collocated pipelines encompass 7 acres (1.3%). Long-term impacts would be reduced, affecting 3 acres (0.5%). No impacts associated with the proposed action are expected to occur in riparian woodlands or riparian shrublands.

In addition to direct habitat loss, the implementation of the proposed action would result in a larger area being impacted due to habitat fragmentation. Fragmentation could alter species composition and abundance. Fahrig (2003) defined habitat fragmentation as the process by which the overall amount of habitat within a landscape is decreased (habitat loss) as well as "the breaking apart of existing habitat into smaller components" (fragmentation). Inherent within this definition is the necessity to view habitat fragmentation as a landscape-scale process and to differentiate between the two aspects of fragmentation; the physical loss of habitat and the breaking apart of habitat into smaller, physically separated parcels. Species that require interior habitat could be displaced, while more common species that prefer openings or forest edges could benefit. The extent of habitat loss associated with the proposed action is identified in Table 11. Proportionately, the juniper and pinyon-juniper dominated habitats would be the most affected because of their dominance within the project area.

Pinyon jays are colonial nesting birds that require greater than 7 square miles of contiguous habitat to provide an adequate home range for a flock (Ligon 1971, Balda and Bateman 1972 *in* Wiggans 2005). Colonies are loose with reported average inter-nest distance of approximately 360 feet (Marzluff and Balda 1992). Pinyon jays not only use pinyon-juniper woodlands, but also mixed woodlands and sagebrush. The OMDP contains an estimated 7,883 acres (12.2 square miles) of suitable habitat. The proposed action would impact 221.9 acres (0.3% of suitable habitat) over a wide area of the OMDP. Given the small percentage of suitable habitat that would be affected and the fact that no nesting colonies were identified during biological surveys (WS 2006), the proposed action is not expected to have a measurable adverse effect on the pinyon jay.

Guzy and Lowther (1997) report that black-throated gray warblers are apparently able to occupy pinyon-juniper areas that have been severely altered. However, insufficient information is available to assess cumulative effects of habitat alteration on local or regional populations (Guzy and Lowther 1997).

Paige and Ritter (1998) reported that isolated stands of sagebrush smaller than 321 acres in area do not support sage sparrows. Samson Mesa, with 474 acres of mapped sage habitat, contains sufficient total area for sage sparrows but the area is fragmented with existing roads and well pads and therefore is not suitable to support a population of nesting sage sparrows.

Another important mechanism leading to a change in breeding bird density and species richness in fragmented habitats is nest predation, which occurs more frequently near forest edges (Dobkin 1994). The most common avian and mammalian nest predators (e.g., American crow, raccoons, and domestic cats) typically occur in higher densities around forest edges (Bider 1968, Whitcomb et al. 1981).

Table 11. Summary of Direct Impacts to BLM Sensitive Plant Species Prior to Mitigation.			
Well Pad/Road Name	**Species Name**	**Number of Plants Lost**	**Comment**
OM35 Well Pad	Adobe thistle	120	All plants would be lost
OM35 Road	DeBeque milkvetch	950	Approximately 95% of this population would be lost
OM36	DeBeque milkvetch	20	Approximately 10% of this population would be lost
D33OU Road	Adobe thistle	4	Acceptable loss
K18OU Road	Adobe thistle	220	Approximately 20% of this population would be lost
Notes: Direct impacts were estimated based on field observations and recent survey plats from TriState Land Surveying. As cut and fill slopes for collated roads & pipelines on steep slopes have not been determined, a disturbance width of 150 feet was used to estimate impacts for the OM35 road and the K18OU road.			

Fragmentation can also increase the risk of nest parasitism by brown-headed cowbirds (*Molothrus alter*), causing declines in local bird populations, including BCC species. These impacts, in conjunction with existing fragmentation and disturbance within and adjacent to the OMDP area, would reduce the value of the largely unfragmented interior habitat available to migratory birds. Habitat fragmentation, as defined by Fahrig (2003), is expected throughout the project area, where ever project activities (i.e. well pad or roadway/pipeline development), occur.

Research indicates that noise associated with development and production activities can also lead to lower avian diversity and density in both adjacent and distant areas (Forman 2000, Forman and Deblinger 2000). The effect of noise varies among bird species but is measurable in areas exposed to relatively moderate levels of noise (LaGory 2001). Noise can mask vocalizations important for mate attraction, social cohesion, predator avoidance, prey detection, navigation, and other basic behaviors. The acoustic interference can potentially result in the reduced ability of individuals to acquire mates, reproduce, raise young, and avoid predation (West 2006). Effects from disturbance associated with drilling and completion activities on the two well pads could be expected whenever these activities occur during the nesting season. During the production and maintenance phase, individual birds may avoid areas disturbed by vehicles servicing wells but because visits are generally infrequent, temporary, and produce significantly less noise, impacts would be negligible.

If vegetation is removed for infrastructure development between April 1 and August 15, the action could result in the destruction of active nests, eggs, or nestlings. To minimize impacts to migratory birds including BCC species, a Timing Limitation (TL) is included as a Condition of Approval (COA). Under the TL, all surface-disturbing activities are prohibited from May 1to June 30. An exception to this COA would be granted if nesting surveys conducted no more than one week prior to surface-disturbing activities indicate that no BCC species are nesting within or adjacent to the area of surface disturbance.

Indirect take (e.g., failure due to abandonment by one or both adults) of nests adjacent to well pads or other areas of infrastructure development can also occur as a result of intolerance to disturbance, although reactions vary among bird species. Reactions can range from subtle body changes undetectable to human observers to aggressive defensive behaviors. Some birds may fly away from the nest, appearing undisturbed but leaving nestlings vulnerable to overheating, hypothermia, predation, or starvation. Landscape-wide impacts of direct and indirect "take" of migratory birds (i.e., destruction of nests, eggs or nestlings, abandonment of nests, decreased productivity over time) could occur due to project activities.

No direct effects to nesting raptors are expected as a result of the proposed action because no known raptor nests occur within 0.25 mile of planned developments (WS 2007). To protect nesting raptors, a COA is included that would require additional raptor surveys under certain circumstances (Appendix D, GJFO No. 22 and GSEO No. 8). Because upland foraging habitat for raptors is abundant in the area, the proposed action is not expected to impact raptor foraging opportunities or behavior.

The development of reserve pits in the project area may attract waterfowl and other migratory birds for purposes of resting, foraging, or as a source of free water. Although the extent and nature of the problem is not well-defined, birds should be prevented from contacting produced water and drilling and completion fluids which may pose a problem (e.g., acute or chronic toxicity, compromised insulation). Mitigation measures to minimize contact with these fluids are presented in Appendix D (GSEO No. 8).

No Action Alternative

Under the no action alternative, one new pad would be constructed; all other existing pads/wells are completed and are in the production/maintenance phase. Impacts to migratory bird habitat would be minimal as compared to the proposed action. The greatest increase in disturbance to migratory birds would be related to noise during well development. This would be a localized, short-term event that is not expected to have a negative impact on the breeding population.

Mitigation: See Operator Committed Mitigation.

Native American Religious Concerns

Affected Environment

The OMDP is located within a larger area identified by the Ute Tribes as part of their ancestral homeland. A field visit by Ute Tribal representatives and GSEO archaeologist on June 11, 2008 confirmed that both areas are considered Traditional Cultural Properties. Cultural resource inventories (see **Cultural Resources**) were conducted to determine if there were any areas that might be culturally sensitive to Native Americans. One area was identified during the inventories and one other area within the OMDP boundary is currently known by the GSFO. Additionally, the Ute Tribe (Northern Ute), Southern Ute, and Ute Mountain Ute Tribes were notified of the proposed Orchard GAP II on December 26, 2007. No responses, questions, or requests for additional information have been received as of June 16, 2008.

Environmental Consequences

Proposed Action

Direct impacts of construction have the potential to irreparably damage or destroy buried culturally sensitive sites. Additionally, impacts that affect the physical setting could result in a loss of what makes an area significant. There may also be other unidentified culturally sensitive or significant locations in the area that have not been identified by the Ute tribes. As currently planned, the proposed action will avoid all Native American historic properties. However, unauthorized modification of roads, pipelines, and well pads may lead to adverse impacts.

The proximity of Native American sites to planned development within the OMDP area may result in indirect impacts that may adversely impact the significance of resources by changing the setting, location, association, and feeling. Indirect impacts can affect any historic property, but there are 12 sites in the OMDP that may particularly sensitive to this type of impact.

Cumulative impacts of increased development, access, construction, operation, and maintenance may also adversely impact these sites, possibly degrading the cultural significance by either destroying the sensitive area or its landscape setting. Impacts to the auditory and visual environment may be of importance in considering values placed on some sites by Native American tribes, thus impacting them. Mitigation measures designed to protect resources of potential Native American concern are presented in Appendix D (GJFO No. 26 and GSEO Nos. 3 & 4).

No Action Alternative

Under the no action alternative, the Applications for Permit to Drill (APDs) associated with the proposed action would be denied and none of the proposed pads, access roads, or pipelines would be developed, and the various rights-of-way required to gain legal access to the area would not be granted. As a consequence, both known and undiscovered Native American resources would be more protected and the potential degradation of site condition and integrity would be reduced or eliminated. Additionally, the information gleaned from the Class III inventories would not have been added to the cultural resource data base thereby reducing the information from which cultural resource land managing decisions are based.

Special Status Species (includes an analysis on Public Land Health Standard 4)

Affected Environment

Federally Listed, Proposed, or Candidate Plant Species

Nineteen species of Federally listed or candidate threatened or endangered plants occur in Colorado. Of these, only two occur or have the potential to occur on lands within the OMDP: the Colorado hookless cactus *(Sclerocactus glaucus)*, Federally listed as threatened, and the DeBeque phacelia *(Phacelia submutica)*, a Federal candidate for listing. The other 17 species either occur in different areas of Colorado, or occur in habitats and elevations not found in the OMDP project area. Brief descriptions of the Colorado hookless cactus and the DeBeque phacelia are found below.

Colorado Hookless Cactus – The Colorado hookless cactus *(Sclerocactus glaucus)* is endemic to western Colorado and generally occurs on gravelly or rocky surfaces on river terrace deposits, lower mesa slopes, and in desert shrub communities on highly alkaline soils at elevations from 4,500 feet to 6,000 feet (Spackman et al., 1997). The cactus flowers from late April through mid-May and is most visible at this time. Previously, this cactus was known as the Uinta Basin hookless cactus, however the taxonomy of this group has been recently redefined so that there are now three species all recognized as threatened: the Colorado hookless cactus *(Sclerocactus glaucus)*, the Uinta Basin hookless cactus *(Sclerocactus wetlandicus)*, and the Pariette cactus *(Sclerocactus brevispinus)* (50 CFR Part 17, Federal Register Vol. 72, No. 180, Sept. 18, 2007). The Uinta Basin hookless cactus and the Pariette cactus are found along and near the Green River of northeastern Utah and do not occur in Colorado. There are several known locations of the Colorado hookless cactus within and adjacent to the project area.

The DeBeque phacelia, a Federal candidate species, occurs on sparsely vegetated steep slopes in chocolate brown or gray clay soil formed on the Atwell Gulch and Shire Members of the Wasatch Formation from 4,700 to 6,200 feet in elevation (Spackman et al.1997). This small annual plant flowers from late April to early June, depending on weather conditions. By late summer, the plant will shrivel up and may be washed or blown away. In some years, DeBeque phacelia may not sprout or flower at all, making surveys difficult. However, all potential habitat for this plant was mapped during the surveys. Numerous locations known to be occupied by DeBeque phacelia occur within and adjacent to the OMDP

project area, and several locations not known to be occupied are considered potential habitat for this species.

Three rare plant surveys have been completed for the Orchard Area. The first, by Buys & Associates, Inc. in 2004 (Buys & Associates, Inc. 2004), covered proposed well pads, roads, and pipelines associated with the 6,640 acre Orchard Unit Geographic Area Plan (USDI 2005a). The second, by Western Ecological Resource, Inc. in May 2007 (WER 2008a), covered the proposed pads, roads, and pipelines for the OMDP. The third, by Western Ecological Resource in May 2008 (WER 2008b), covered the proposed pipeline corridor between proposed F18OU pad and the existing G18OU pad. In addition, the Colorado Natural Heritage Program (CNHP 2006) documented other rare plant populations within the project area.

The results of the rare plant survey for the OMDP project area (WER 2008a & b), in combination with data from previous surveys and the CNHP, revealed the presence of two individual Colorado hookless cacti within 200 meters of ground disturbing activities associated with the proposed F18OU pad and access road. The first occurs on BLM lands approximately 230 feet (70 m) from the proposed F18OU pad and the second occurs on Bureau of Reclamation (BOR) lands 800 feet (244 m) from the edge of the proposed F18OU pad and 600 feet (183 m) from the proposed access road to F18OU. The determination for the Colorado hookless cactus following informal consultation with the U.S. Fish and Wildlife Service was "May Affect, Not Likely to Adversely Affect" (WER & BLM 2008c). An additional 14 Colorado hookless cacti occur between 853 feet (260 m) and 1,300 feet (400 m) north of the proposed pad on BOR land. Existing County Road W is located 50 to 558 feet (15 to 170 m) north of these plants. These were included in the BA analysis although they are outside of the OMDP boundary.

Numerous populations and potential habitat of DeBeque phacelia were found within 656 feet (200 m) of proposed ground-disturbing activities in the project area. These include a population 656 feet (200 m) from proposed pad ON6; three populations 230 to 558 feet (70 to 170 m) from the existing County road and adjacent proposed gathering line between pads ON6 and OP13, a population 450 feet (137 m) from the proposed access road to OM36, and a population 450 feet (137 m) from proposed pad OM35. In addition, the proposed road to OM35 passes through 0.7 acres of potential habitat for DeBeque phacelia and is 300 feet (91 m) from a previously recorded CNHP population.

BLM Sensitive Plant Species

Six BLM sensitive plant species are listed as being potentially present or have been found on lands administered by the GSFO, and 20 species have been found on lands administered by the GJFO. However, only four species occur or have the potential to occur within the OMDP project area: DeBeque milkvetch *(Astragalus debequaeus)*, Naturita milkvetch *(Astragalus naturitensis)*, adobe thistle *(Cirsium perplexans)*, and aromatic Indian breadroot *(Pediomelum aromaticum)*. These species and their habitats are described below.

DeBeque Milkvetch – The DeBeque milkvetch occurs on varicolored, fine-textured, seleniferous, saline soils of the Atwell Gulch Member of the Wasatch Formation at elevations from 5,100 to 6,400 feet (Spackman et al. 1997). The cream-colored flowers are apparent in early spring, usually starting in mid-April. However, the plant also remains quite distinctive during its fruiting period which lasts from May into early June. Several populations of this plant are known in the OMDP project area.

Naturita Milkvetch – The Naturita milkvetch occurs on sandstone mesas, ledges, crevices, and slopes in pinyon-juniper woodlands at elevations from 5,000 to 7,000 feet (Spackman et al. 1997). The purple and white flowers are evident in April and May, and the usually red-mottled pods are evident from mid-May to June. As with most *Astragalus* species, it is best to have fruiting pods to confirm the identification of

this plant. There are no known occurrences of this plant within the project area, but appropriate habitat is present.

Adobe Thistle – The adobe thistle *(Cirsium perplexans)* is endemic to the Colorado and Gunnison river valleys, where it occurs on adobe clay soils in open areas, disturbed sites of pinyon-juniper woodlands, and mixed shrublands (Spackman et al. 1997). The flowers of this species bloom in late May to early July but is distinctive all year if flowers or fruiting heads are present. Several locations of the adobe thistle are known in the OMDP project area.

Aromatic Indian Breadroot – Aromatic Indian breadroot *(Pediomelum aromaticum)* is a BLM sensitive species in the GJFO. This plant occurs in open pinyon-juniper woodlands, in sandy or adobe soils from 4,800 to 5,700 feet (Spackman et al. 2007). It closely resembles largeflower breadroot *(Pediomelum megalanthum*) and often occurs with it. Aromatic Indian breadroot is known from the Pyramid Rock Research Natural Area, an Area of Critical Environmental Concern located 2.7 miles west of the OMDP (Lincoln 2007).

In addition, a significant portion of the OMDP project area lies within the Rare Plants of the Wasatch Potential Conservation Area as described by the Colorado Natural Heritage Program.

The two rare plant surveys completed for the Orchard Area (Buys & Associates, Inc. 2004, WER 2008) also addressed BLM sensitive species. The results of those surveys, in combination with data from previous surveys and the CNHP data, revealed the presence of BLM sensitive plant populations in the vicinity of many proposed pads, existing and proposed roads, and proposed pipelines. All of these locations are within the GJFO.

A large population of approximately 1,000 DeBeque milkvetch plants was found on the proposed access road to OM35. Two other populations were found in the vicinity of proposed pad OM36. The larger of these consists of approximately 200 plants and is located 100 feet from a corner of the proposed pad. The smaller population near the proposed OM36 pad is approximately 490 feet from the pad.

Numerous populations of adobe thistle were found within 656 feet (200 m) of proposed ground-disturbing activities in the project area: two populations 300 feet (91 m) from proposed pad ON6; one population 200 feet (61 m) from proposed pad OP13; another population 200 feet (61 m) from existing County road and adjacent proposed gathering line between pads ON6 and OP13; a population adjacent to the proposed access road to K18OU; six populations in the vicinity of proposed pads J31OU, F32OU, and D33OU and their proposed and existing access routes; and a population within 45 feet (14 m) of the edge of proposed pad OM35.

No populations of the BLM sensitive Naturita milkvetch or aromatic Indian breadroot were found or are known to occur within the OMDP project area.

Federally Listed, Proposed, or Candidate Animal Species

According to the latest species list from the U.S. Fish and Wildlife Service (http://mountain-prairie.fws.gov/endspp/CountyLists/COLORADO.pdf) the following Federally listed, proposed, or candidate animal species may occur within or be impacted by actions occurring within Garfield and Mesa Counties: Canada lynx (*Lynx canadensis*), Mexican spotted owl (*Strix occidentalis lucida*), yellow-billed cuckoo (*Coccyzus americanus*), razorback sucker (*Xyrauchen texanus*), Colorado pikeminnow (*Ptychocheilus lucius*), bonytail chub (*Gila elegans*), and humpback chub (*Gila cypha*). The bald eagle (*Haliaeetus leucocephalus*) was removed from the listed of threatened or endangered species in August 2007. The BLM now considers the bald eagle a sensitive species.

Of these species, only the Canada lynx, razorback sucker, and Colorado pikeminnow occur or have suitable habitat within or near the project area. The bonytail chub and humpback chub have habitat within the Colorado River approximately 60 miles downstream of the project area.

Canada Lynx – Lynx habitat does not occur within the project area boundary. However, proposed well pad A21OU is located adjacent to U.S.D.A. Forest Service lands which are included as part of the Battlement Lynx Analysis Unit (LAU). An LAU is a project-planning unit intended to provide the fundamental or smallest scale with which to begin evaluation and monitoring of the effects of management actions on lynx habitat (Ruediger et al. 2000). The nearest suitable lynx habitat within the LAU is approximately 1.65 miles from the A21OU pad. Intervening unsuitable habitat is comprised of pinyon-juniper woodlands, the climax community for this area.

Razorback Sucker – The razorback sucker is one of the largest suckers in North America, growing to lengths exceeding 3 feet and weighing up to 13 pounds. Once widespread throughout most of the Colorado River Basin, this species is now found only in the upper Green River in Utah, the lower Yampa River in Colorado, and occasionally in the Colorado River near Grand Junction. The current population estimate is about 500 individuals (http://coloradoriverrecovery.fws.gov). Razorback suckers inhabit only large rivers and are not found in smaller tributaries and headwater streams. Adults are associated with backwaters and areas of strong current in depths from 4 to 10 feet.

Colorado Pikeminnow – The Colorado pikeminnow is the largest minnow in North America, growing at one time to nearly 6 feet in length and weighing up to 80 pounds. It was historically found throughout the entire Colorado River Drainage but is now restricted to the lower reaches of the Green, Yampa, White, Colorado, Gunnison, Dolores and Animas Rivers (Woodling 1985). Within the Colorado River, this fish is found from Palisade, Colorado, downstream to Lake Powell. Adults are found in large, deep eddies, pools, and other areas adjacent to the main current flow; young inhabit shallow, quiet backwater areas off main river channels.

Bonytail chub – Adults at 7 years of age can be up to 14 inches in length and greater than one pound. Color can change based on turbidity, in clear waters they are very dark and pale in turbid waters (Woodling 1985). Historically they were found throughout the Colorado River Drainage, in Colorado they have been found near Delta in the Gunnison River and in the Green River. Occasionally they are found west of Grand Junction, their range does not extend eastward from Grand Junction. The species prefers eddies and pools and not face currents. Cooling of water temperature due to dams and hybridization with other members of the genus *Gila* is likely tied to the decline of this species.

Humpback chub – Adults are pale in color and usually between 12 and 14 inches long. Present populations are found in and above the Grand Canyon. Historically they have been found in the Yampa, Gunnison, Green, and Colorado Rivers downstream of Grand Junction (Woodling 1985). Habitat typically is in canyons with swift current and whitewater (USFWS 2008). Only one population, at Black Rocks, is known to exist in Colorado. The largest known population is in the Grand Canyon and may be up to 10,000 individuals. The range does not extend eastward from Grand Junction.

BLM Sensitive Animal Species

BLM sensitive wildlife species with habitat and/or occurrence records in the area include the bald eagle (*Haliaeetus leucocephalus*), greater sage-grouse (*Centrocercus urophasianus)* milk snake (*Lampropeltis triangulum taylori*), midget faded rattlesnake (*Crotalus viridis concolor*), and Great Basin spadefoot (*Spea intermontana*). In addition, four BLM sensitive fish species—the flannelmouth sucker (*Catostomus latipinnis*), bluehead sucker (*Catostomus discobolus*), roundtail chub (*Gila robusta*), and

Colorado River cutthroat trout (*Oncorhynchus clarki pleuriticus*)—are known to inhabit the Colorado River.

Bald Eagle – Bald eagles nest along the Colorado River in western Colorado at low densities. In 2007, there were 3 active nests between New Castle and DeBeque. The number of wintering bald eagles in this area depends on a variety of factors and varies between years. A biological assessment and informal consultation with the U.S. Fish and Wildlife Service (USFWS) was completed prior to the August 2007 removal of this species from the Federal list of threatened and endangered species (WSL and BLM 2007). The biological assessment and USFWS concurrence letter are included in Appendix E.

Greater Sage-grouse – The project area is within the historic range of the greater sage-grouse, occupied sage-grouse breeding habitat occurs north of the project area across the Colorado River. Greater sage-grouse scat (excrement) was recently detected south of the project area near Collbran and is believed to be associated with winter use by greater sage-grouse. Because the project area occurs between known breeding areas and a likely wintering area it can be assumed that appropriate habitats within the project area are occasionally used by greater sage-grouse, though the extent of use is unknown at this point.

Milk Snake – The milk snake occurs in a wide variety of habitats in Colorado, including shortgrass prairie, sand prairie, shrubby hillsides, canyons, open stands of ponderosa pine, pinyon-juniper woodland, and arid river valleys. The milk snake uses all habitat types throughout the project area at elevations below 8,500 feet (Hammerson 1999). Because the milk snake is principally nocturnal, effects for this species will predominantly occur during the well construction phase when more vehicle traffic is present at night. Home range sizes are not available for this species; therefore it is not possible to estimate the population size existing within the OMDP. CNHP data reveals no element occurrences within or near the OMDP. No denning sites are known within the OMDP. Collection is one of the greatest risks facing this species throughout its range (Hammerson 1999).

Midget Faded Rattlesnake – The midget faded rattlesnake is known to occur in dry sagebrush juniper forests and sage lands in small isolated groups centered on den sites (USGS 2007) within western Colorado, southern Wyoming and eastern Utah (Hammerson 1999). CNHP element occurrences are found up and down the Colorado River from the OMDP and the species is likely to exist in the OMDP. Other occurrences not identified through the CNHP are located northeast and southwest of the project area. Although movements of the midget faded rattlesnake are not well known, they are believed to be limited to a few 100 meters from den sites. No known den sites exist within the OMDP; therefore it is not possible to estimate the population size existing within the OMDP. The species' distribution and its natural history make it susceptible to impacts from human disturbance (USGS 2007). Threats include direct mortality from vehicles traveling on roads and pads, off-highway vehicle use throughout the landscape, capture by collectors, and livestock grazing. As access increases into previously undeveloped areas the risk of encounters with humans will increase, resulting in some cases in mortality or collection. Energy development will further increase areas in which predator (wildlife and human) avoidance will be compromised.

Great Basin Spadefoot – This species is found in rocky canyons, broad dry basins, and stream floodplains scattered throughout northwestern Colorado. It is inactive most of the year, emerging from the substrate of seasonal ponds or ephemeral streams to breed and feed during periods of protracted surface moisture (Hammerson 1999). Individuals have been located in both Garfield and Mesa Counties both the exact locale is not provided. The toad has the potential to occur in all habitats present within the project area at elevations below 7,000 feet (Hammerson 1999). Home range sizes are not available for the toad; therefore it is not possible to estimate the population size existing within the OMDP. Threats include direct mortality from vehicles traveling on roads and pads, off-highway vehicle use throughout the landscape, and collection. Crushing of adults could increase in the spring around wet areas (including

standing water on pads and standing water in vehicle ruts). Livestock grazing can deteriorate riparian habitats or other wet areas where breeding may occur, leading to a reduction in recruitment into the population in addition to the risk of toads and egg masses being trampled. Both adults and toadlets will be at greater risk of being crushed by vehicles on- and off-road as road densities increase. As more land is cleared of vegetation predation can increase because of a greater ease of detection by predators.

Flannelmouth Sucker – The flannelmouth sucker is restricted to larger streams and rivers in the middle and upper Colorado River Basin. In Colorado, this species is found only in large rivers, where it occupies all habitat types, including riffles, runs, eddies, and backwaters (Woodling 1985).

Bluehead Sucker – This species is found throughout the middle and upper Colorado River Basin, in a variety of areas from headwater streams to large rivers (Woodling 1985). The bluehead sucker prefers areas with a rock substrate and mid to fast flowing waters. It is not likely to exist within waters within the project area but could occur in the Colorado River near the project area.

Roundtail Chub – The roundtail chub is found in the Colorado River mainstem and large tributaries (Woodling 1985). Adults inhabit slow-moving water near areas of faster water and swim into the faster water in small groups to forage. Young-of-the-year prefer shallow river runs, while juveniles concentrate in eddies. It is not likely to exist within waters within the project area but could occur in the Colorado River near the project area.

Environmental Consequences

Proposed Action

Federally Listed, Proposed, or Candidate Plant Species

Colorado Hookless Cactus – Two Colorado hookless cacti in the vicinity of pad F18OU are within 656 feet (200 m) of proposed ground-disturbing activities. There are an additional 14 Colorado hookless cacti between 853 feet (260 m) and 1,300 feet (400 m) north of the proposed pad and within 50 feet (15 m) of existing County Road W. Because 2 of the 16 cacti occur within 656 feet (200 m) of existing and proposed ground disturbing activities, monitoring would be required (Appendix F) for all. In addition, EnCana shall not apply magnesium chloride within 100 meters of Colorado hookless cacti and EnCana shall not apply herbicides within 100 meters of Colorado hookless cacti unless approved by the GSEO Ecologist. Other mitigation requirements as found in the standard conditions of approval (Appendix D) include dust control (GJFO No. 8 and GSEO No. 2), weed control (GJFO No. 19 and GSEO No. 7), and reclamation (GJFO No. 18 and GSEO No. 13). With implementation of these mitigations which are outlined in more detail in the BA (WER & BLM 2008c), the proposed action would meet a determination of "May Affect, Not Likely to Adversely Affect" the Colorado hookless cactus.

DeBeque Phacelia – The proposed action would cause a loss of approximately 0.07 acres of potential DeBeque phacelia habitat along the proposed road/pipeline to OM35. This habitat was observed during the rare plant surveys completed in May of 2007; however no DeBeque phacelia plants were observed, and it is unknown if the habitat is actually occupied. It is the policy of the GSFO and GJFO that all potential habitat for DeBeque phacelia, as well as historically or presently occupied DeBeque phacelia habitat, is identified and mapped when special status plant surveys are conducted. If potential habitat is found, but there is no DeBeque phacelia present, this habitat is considered to be occupied.

The proposed road/pipeline to OM35 should be re-routed to the existing road located downslope and to the west. If this is not possible, the proposed OM35 pad and access road should be denied, due to the fact that the road as proposed would result in a loss of 0.7 acres of potential DeBeque phacelia habitat, as well

as approximately 950 DeBeque milkvetch plants (See BLM Sensitive Plant Species section below). One of the objectives of BLM special status species policy (USDI 2001) is to ensure that actions requiring authorization and approval by the BLM are consistent with the conservation needs of special status species and do not contribute to the need to list any special status species. DeBeque phacelia is currently a candidate for listing as threatened or endangered under the provisions of the Endangered Species Act. Additionally, this species is expected to be reviewed for listing in the near future, and there is a very real possibility that it will be listed, given the immediate threats of OHV use and oil and gas development. (Mayo 2008). Therefore, it is the opinion of the GSEO and GJFO Ecologists that this action may result in a trend toward Federal listing of the DeBeque phacelia as threatened or endangered. All other populations and potential habitat of DeBeque phacelia within 656 feet (200 m) of ground-disturbing activities will not be directly affected but could be indirectly affected by increases in dust, weed invasion, OHV use, and a loss of pollinators and their habitat. Monitoring would be required for all special status plant populations within 656 feet (200 m) of ground-disturbing activities (Appendix F). For a complete discussion of potential indirect effects and measures to mitigate these effects, please see the *BLM Sensitive Plant Species Environmental Consequences* section.

BLM Sensitive Plant Species

The proposed action would result in the direct loss of an estimated 344 adobe thistle plants and 970 DeBeque milkvetch plants. As summarized in Table 11, fill material for the OM36 pad would likely result in the loss of approximately 20 DeBeque milkvetch plants, or about 10% of that population. In addition, the proposed access road to OM35 would result in the loss of approximately 950 DeBeque milkvetch plants, or about 95% of that population.

The waste material pile for proposed pad OM35 would probably result in the loss of a small population of adobe thistle totaling approximately 120 plants. The proposed access road to D33OU would result in a loss of 4 adobe thistle plants. Finally the proposed access road to K18OU could result in a loss of approximately 220 adobe thistle plants, or about 20% of that population.

Several mitigation measures would be implemented to minimize the loss of BLM sensitive plants in the project area. With the implementation of the following mitigation measures, the loss of DeBeque milkvetch plants would be avoided completely, and the loss of adobe thistle plants would be reduced to only four plants. These mitigation measures include the following:

DeBeque Milkvetch – The proposed road/pipeline to OM35 should be re-routed to the existing road located downslope and to the west. If this is not possible, the proposed OM35 pad and access road should be denied, due to the fact that the road as proposed would result in an unacceptable loss of approximately 950 DeBeque milkvetch plants. As mentioned previously, one of the objectives of BLM special status species policy (USDI 2001) is to ensure that actions requiring authorization and approval by the BLM are consistent with the conservation needs of special status species and do not contribute to the need to list any special status species. DeBeque milkvetch was petitioned for listing under the Endangered Species Act in 2004 (CNE & CoNPS 2004). The petition was determined by the USFWS to be "not warranted" due to lack of substantial or commercial information indicating listing was warranted (USFWS 2007a). It is the opinion of the GSEO and GJFO Ecologists that the proposed action may contribute to the need to list the DeBeque milkvetch under the provisions of the ESA.

Proposed pad OM36 should be moved at least 656 feet (200 meters) to the east if possible. At the very minimum, the entire DeBeque milkvetch population adjacent to proposed pad OM36 will be fenced prior to ground disturbing activities to avoid accidental impacts. Currently, this population resides directly down slope and adjacent to the proposed sediment retention fence for the well pad. (It is expected this sediment fence will protect the DeBeque milkvetch from potential erosion and sedimentation impacts.)

Finally, the proposed pipeline route northwest of OM36 will be surveyed for rare plants prior to any construction activities.

Adobe Thistle – The waste material pile for OM35 will be relocated to avoid impacts to the 120 adobe thistle plants found there. This population will be fenced to provide additional protection. The adobe thistle population along the proposed road to K18OU will be fenced prior to ground-disturbing activities to prevent direct impacts to this population. If direct impacts to the adobe thistle cannot be avoided, seeds would be collected and redistributed into the surrounding area after construction to mitigate the loss of adobe thistle.

A number of indirect effects to special status species could result from the proposed action, including an increase in dust, weed invasion, OHV use, erosion and sedimentation, and reduction in pollinators and their habitat. Potential impacts to plants from the accumulation of dust include clogged plant pores, reduced light reception, and alteration of glyphosate uptake mechanisms (Boerboom 2006, Ferguson et al. 2007). The clogging of pores can interfere with growth rates and water transpiration (Salisbury and Ross 1992). Additionally, Sharifi et al. (1997) determined that dust has the ability to increase the surface temperature of the leaves of desert plants due to increases in absorbance of infrared radiation leading to decreased growth rates and plant vigor.

The road effect zone can extend several times the actual width of a road and as much as 50 meters down slope and has been documented as accounting for approximately 40% of fugitive dust within an area (Forman and Alexander 1998, Ferguson et al. 2007). Impacts from dust would decrease as activity within the project area moves from construction and completion phases to production and operations/maintenance phases. Additionally, implementation of best management practices for dust reduction would further decrease dust impacts. Monitoring would be required for all special status plant populations within 656 feet (200 m) of ground-disturbing activities (Appendix F). If dust is determined to be affecting special status plant species, additional dust suppression techniques would be required.

Another indirect effect could be an increase in invasive weeds from ground disturbing activities. Invasive weeds could compete with special status plants for water, nutrients, and light or change ecosystem processes, such as increasing fire regimes. DeBeque phacelia may be especially susceptible to weed invasion. It may not be able to tolerate invasive and aggressive species that colonize its habitat or changes in fire regime that often accompany invasion by cheatgrass (Ladyman 2003). DeBeque milkvetch is also thought to be susceptible to competition from invasive weeds or even native species that may be included in reclamation seed mixes (CNE & CoNPS 2004). Mitigation measures designed to minimize the spread of invasive species are presented in Appendix D (GJFO No. 19 and GSEO No. 7). Additionally, monitoring would be required for all special status plant populations within 656 feet (200 m) of ground-disturbing activities (Appendix F). If weeds are determined to be affecting special status plant species, additional weed control measures would be required.

Indirect impacts may also result from increased public access to the area following construction of new roads and improvement of existing roads. Off-highway vehicles (OHVs) could diverge from roads and travel cross-country through open hillsides and benches, crushing vegetation and damaging soil leading to increased erosion, sedimentation, and weed spread.

DeBeque phacelia occupies highly erosive soils and is particularly sensitive to impacts from OHV use. Because DeBeque phacelia relies on the persistence of a healthy seed bank in the top few centimeters of soil, any compaction, tire rutting, or increased erosion could disrupt the seed bank, disrupt germinating seedlings, or could affect the shrink-swell cracking of the soil surface that DeBeque phacelia relies on (Burt and Spackman 1995).

Increased use of OHVs is of particular concern in the OMDP project area and it is currently designated "open" for cross-country travel in the 1984 Glenwood Springs Resource Area Resource Management Plan (GSRA RMP) (USDI 1984) and in the Grand Junction Resource Area Resource Management Plan (GJRA RMP) (USDI 1987). However, a new RMP is currently being developed for the GSFO, and the proposal is to limit cross-country travel by designating certain roads and trails for OHV use (Brenneman 2008). The GJFO and GSEO are both currently working to restrict open OHV use. Additionally, the State of Colorado passed House Bill HM08-1069 which allows state law enforcement officers to ticket OHV violations on Federal lands. In the GJFO, the next RMP is still several years away; however it is also anticipated there would be designated OHV routes in the OMDP project area, rather than open cross-country travel. In either case, the OMDP project area is currently open for cross-country travel; therefore, monitoring of OHV use would be required for all special status plant populations within 656 feet (200 m) of ground-disturbing activities (Appendix F). If OHVs are determined to be affecting special status plants, appropriate measures would be taken, such as installing signage, fencing affected plant populations, or gating and locking certain access roads to prohibit OHV use. See **Transportation** Section.

The building of pads, roads, and pipelines uphill of special status species populations could lead to indirect impacts from soil erosion and sedimentation. These impacts would be mitigated by requiring the installation of sediment fences above the potentially affected plant population. Additionally, monitoring would be required for all special status plant populations within 656 feet (200 m) of ground-disturbing activities (Appendix F). If erosion and sedimentation are determined to be affecting special status plant species, additional measures for control of erosion and sedimentation would be required.

Finally, the proposed action could reduce the amount or quality of habitat needed by pollinator species. Mitigation to minimize this effect would include reclaiming the disturbed areas using a BLM-approved native seed mix. Mitigation measures designed to minimize the loss of pollinator habitat are presented in Appendix D (GJFO No. 18 and GSEO No. 13).

Federally Listed, Proposed, or Candidate Animal Species

Canada Lynx – Project activities would not occur within a Lynx Analysis Unit. Suitable lynx habitat including travel linkages do not occur within one mile of proposed developments. Therefore, implementation of the proposed action would have **No Effect** on Canada lynx.

Razorback Sucker and Colorado Pikeminnow – In May 1994, BLM prepared a programmatic biological assessment (PBA) that addressed water-depleting activities in the Colorado River Basin. In response, USFWS issued a programmatic biological opinion (PBO), which determined that depletions from the Colorado River Basin would jeopardize the continued existence of the endangered Colorado River fishes and consequently would lead to a "May Affect, Likely to Adversely Affect" determination for all water-depleting activities. The PBO was written to remain in effect until a total depletion of 2,900 acre-feet per year for Federally permitted activities is reached and includes measures to allow BLM to authorize projects with depletions of less than 125 acre-feet per year.

An amendment to the PBO in 2000 increased the threshold to 3,000 acre-feet per year and excluded depletions associated with oil and gas drilling, based on the assumption at that time that such operations produce more water than they deplete. BLM will soon complete a new PBA addressing the impact of depletions associated with oil and gas development in western Colorado, including the GSFO area. Once the USFWS issues a new PBO—anticipated for early summer 2008—the BLM will be responsible for tracking all wells drilled into Federal leases and reporting the corresponding depletions annually to the USFWS. In the meantime, BLM is continuing to operate under the 2000 amendment to the 1994 PBO.

In March 2007 a Biological Assessment of the proposed action included a "No Effect" determination for the Colorado River fishes (Wildlife Specialties 2007). The U.S. Fish and Wildlife Service (USFWS) responded that the correct effect determination was "Likely to Adversely Affect" (USFWS 2007b). The projected depletion amount of 32 acre-feet is less than 100 acre-feet/year and can be addressed by the programmatic biological opinion issued to the BLM on 13 June 2004 (amended March 2 2000 and September 27 2005) for small water depletion caused by BLM authorized activities in the Colorado River basin in Colorado (biological opinion number ES/GJ-6-C0-94-F017). This biological opinion does not require individual consultation for each small depletion project but it does require the BLM to provide the Service an annual report of all water depletions associated with BLM authorized activities. Therefore each of the respective BLM offices authorizing this EA should include the depletions associated with the OMDP in their annual reports to the BLM State Office.

Construction of the proposed developments would increase the potential for soil erosion and sedimentation. The mitigation measures presented in Appendix D (GJFO No. 3, 9 & 13 and GSEO No. 13) would reduce the potential. Although a minor temporary increase in sediment transport to the Colorado River may occur, it is not likely that the increase would be detectable above current background levels. In any case, all of these Federally listed fishes are adapted to naturally high sediment loads. Additional consultation with the USFWS is not necessary.

BLM Sensitive Animal Species

Greater Sage-grouse – The OMDP is within the historic range of the greater sage-grouse and likely greater sage-grouse did occur within the OMDP where appropriate habitat was present. Currently greater sage-grouse are located predominantly north of the Colorado River; however, scat was identified in 2008 south of the project area. Actual use of the project area by grouse is expected to be minimal; however implementation of this project is likely to discourage grouse from moving back into the area for the life of the development.

Milk Snake, Midget Faded Rattlesnake, and Great Basin Spadefoot – Direct effects on these species could include injury or mortality as a result of construction, production, and maintenance activities. These effects would be most likely during the active season for these species, which are April to October for the milk snake, March to October for the midget faded rattlesnake, and May through September for the Great Basin spadefoot. Indirect effects for the two snake species could include a greater susceptibility to predation if the road or pad is used for temperature regulation. The potential for injury or mortality as a result of vehicles traveling on new roads and pads would increase for individuals of all three species. However, the potential for effects is low and impacts at the population level are not expected.

Flannelmouth Sucker, Bluehead Sucker, and Roundtail Chub – Mitigation measures presented in Appendix D (GJFO Nos. 3, 9 & 13 and GSEO No. 13) would be implemented to minimize sedimentation of the Colorado River and tributary streams. Although minor temporary increases may occur, they are unlikely to be detectable above background levels. For this reason, and because the flannelmouth sucker, bluehead sucker, and roundtail chub are adapted to high sediment loads, the proposed action would not be expected to adversely affect these species.

Environmental Consequences

No Action Alternative

Federally Listed, Proposed, or Candidate Plant Species

Under the no action alternative, the developments described in the proposed action would not occur; however, continued operations and maintenance activities associated with the existing 22 pads and 75 associated wells would present potential indirect effects to Federally listed or candidate plant populations as discussed above.

BLM Sensitive Plant Species

Under the no action alternative, the developments described in the proposed action would not occur; however, the previously approved A28OU pad, which to date has not been constructed, would still potentially impact a population of adobe thistle. Also, continued operations and maintenance activities associated with the existing 22 pads and 75 associated wells would present potential indirect effects to sensitive plant populations as discussed above.

Federally Listed, Proposed, or Candidate Animal Species

The no action alternative would not cause impacts to any Federally listed, proposed, or candidate species, because suitable habitat for these species does not occur in the affected area.

Any impacts to Federally listed Colorado River fish species associated with water depletions will be documented by the Grand Junction and Glenwood Springs BLM offices per the 2000 Biological Opinion.

BLM Sensitive Animal Species

Impacts to BLM sensitive wildlife species under the no action alternative would be negligible due to the small scope of development and the fact that most actions associated with the no action alternative are in the production/maintenance phases which are less intensive than construction and completion phases.

Analysis on the Public Land Health Standard for Special Status Plant and Animal Species and their Habitats. The Battlement Mesa Area land health assessment (USDI 2000) concluded that Standard 4 was being met for all species considered in the assessment document. Habitat alteration associated with gas development actions could result in deteriorated conditions essential for some species of concern.

Provided that mitigation measures are implemented for the OMDP project area, it is not likely that the Proposed Action would result in a failure to achieve Standard 4 for special status animal species and their habitats.

Analysis on the Public Land Health Standard for Special Status Plant and Animal Species and their Habitats. The results of a recent land health assessment in the GSFO, the Battlement Mesa Area Land Health Assessment (USDI 2000), indicate that habitat conditions are suitable for those special status animal species which are known or likely to occur there. The proposed action would facilitate increased natural gas development which would further fragment habitat, reduce habitat connectivity, and reduce habitat patch size within the Battlement Mesa landscape. When considered with natural gas development that has occurred since the assessment, this Federal action would likely contribute to a declining trend and reduce the potential for meeting or maintaining Standard 4 for certain Threatened, Endangered, and BLM Sensitive Animal Species over the long-term. Provided that mitigation measures are implemented for the

OMDP project area, it is unlikely that the Proposed Action would result in a failure to achieve Standard 4 for special status animal species and their habitats. Please note that a Land Health Assessment has not been completed for portions of the OMDP project area in the GJFO, where most special status plants occur.

The Battlement Mesa Area Land Health Assessment also found that Standard 4 is being achieved for BLM special status plants throughout the assessment area. However, it was noted no special status plants actually occurred there at that time (USDI 2000). With the discovery of special status plant populations and the continued habitat alteration associated with the proposed action, this Federal action would likely contribute to a declining trend and help to reduce the potential for meeting or maintaining Standard 4 for certain special status plant species over the long-term. With the implementation of the mitigation measures identified in this section and elsewhere in the EA, Standard 4 for special status plants and their habitats should continue to be achieved. Please note that a Land Health Assessment has not been completed for portions of the OMDP project area in the GJFO, where most special status plants occur.

Because the proposed developments would not occur with the no action alternative, failure of the area to achieve Standard 4 for special status plant and animal species is not expected.
Provided that mitigation measures are implemented for the OMDP project area, it is not likely that the Proposed Action would result in a failure to achieve Standard 4 for special status animal species and their habitats.

Wastes, Hazardous or Solid

Affected Environment

A variety of wastes would be generated during drilling, well completion, and post-completion operations. Hazardous materials would also be used on site. These wastes and hazardous materials are described below. A complete list of hazardous materials that could be produced, stored, used, transported, or disposed as a result of the project is provided in Appendix L of the Glenwood Springs Resource Area, Oil & Gas Leasing and Development, Draft Supplemental Environmental Impact Statement (BLM 1999), Hazardous Substance Management Plan.

During drilling operations, drill cuttings from the well bore (mainly shale, sand, and miscellaneous rock minerals) and drilling fluids (mud) will be generated and contained in the reserve pit. The mud, primarily bentonite clay, is amended as necessary with various chemicals in order to achieve borehole stability, minimize possible damage to the formation, provide adequate viscosity to carry the drill cuttings out of the well bore, and reduce downhole fluid losses.

EnCana is considering the implementation of a closed-loop drilling system that would recycle drilling fluids, thereby eliminating the need for a reserve pit. If this method is used, cuttings would be moved through a shaker system on the drill rig that captures drilling fluids from the cuttings. The cuttings would typically be placed on the pad location within a containment berm until enough are collected to mix with Solibond, powdered gypsum, or similar material to further dry and achieve a solid state. The solidified cuttings would typically remain on the pad location and be spread on location during the interim reclamation phase of the pad when excavation equipment is used to reshape and contour the pad.

During well completion operations, liquid hydrocarbons and produced water will be stored in tanks on the location. As described below, these materials will be taken offsite for proper disposal during post-completion operations, or as required during well completion operations. Other solid wastes associated with drilling and well completion would include human waste and trash. Portable, self-contained chemical toilets will be provided for human waste disposal. Upon completion of operations, or as

required, the toilet holding tanks will be pumped and contents therein disposed of in an approved sewage disposal facility. Sewage disposal will be in strict accordance with Colorado State rules and regulations regarding sewage treatment and disposal. All garbage and non-flammable waste material will be contained in a self-contained, portable dumpster or trash cage. Upon completion of operations, or as needed, the accumulated trash will be hauled offsite to a State of Colorado approved sanitary landfill.

During post-completion operations, a separation/dehydration unit will be used to remove condensate (liquid hydrocarbon) from the gas, and aboveground tanks will be used to contain the gas condensate and additional produced water. Produced water at well pads would be transported by truck or buried pipeline to EnCana's existing High Mesa water treatment facility in the South Parachute Field and/or trucked offsite to an approved disposal facility. The produced water may be collected directly at the well pad, or from centralized tank batteries within and outside the Project Area. A pipe network would be used to transport the produced water from the well pad to the tank batteries. Gas condensate would be transported to market by tanker trucks.

A gas gathering pipeline network would gather and deliver gas offsite to the recently-installed West Orchard aka Sunnyside trunk pipeline (16-inch diameter), analyzed in NEPA document EA# CO140-07-055.

Lastly, a variety of materials typical of oil and gas development could be at the site during construction and operations including: lubricants, diesel fuel, gasoline, solvents, antifreeze, and hydraulic fluids. Hazardous materials which may be found at the site may include drilling mud and cementing products which are primarily inhalation hazards, and materials that may be necessary for well completion/stimulation activities such as flammable or combustible substances and acids/gels (corrosives).

Hazardous materials are defined by the BLM as any substance, pollutant, or contaminant that is listed as hazardous under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended, 42 USC 9601 et seq., and its regulations. The definition of hazardous substances under CERCLA includes any "hazardous waste" as defined in the Resource Conservation and Recovery Act (RCRA) of 1976, as amended, 42 USC 9601 et seq., and its regulations. The term does not include petroleum, including crude oil or any fraction thereof that is not otherwise specifically listed or designated as a hazardous substance under CERCLA Section 101(14), 42 USM 9601 (14), nor does the term include natural gas. All hazardous and extremely hazardous substances and commercial preparations will be handled in an appropriate manner to minimize the potential for leaks or spills to the environment.

The Environmental Protection Agency (EPA) has exempted certain waste materials generated in oil and natural gas exploration and production from regulation as hazardous wastes (USEPA 1988). To classify as exempt waste, these materials must be intrinsic or uniquely associated with the production of oil and natural gas. Examples of these exempt wastes include produced water, drilling fluids, and drill cuttings. Although specifically exempted from regulation as hazardous wastes, these materials are considered to be solid wastes and must be disposed in ways that protect human health and the environment.

Environmental Consequences

Proposed Action

Potential impacts from waste generation and hazardous material use on the OMDP project area include potential releases to the environment of well cutting and drilling muds, produced water, gas condensate, and fuels, lubricants and other potentially hazardous products.

If a closed-loop drilling system is not available, a reserve pit could be excavated to contain produced water, well cuttings and drilling muds from each wellbore planned for a pad. Drilling muds may contain small concentrations of a variety of contaminants, including mercury, cadmium, arsenic, and hydrocarbons, which could adversely affect soil and water resources. In order to safely contain cuttings and drilling muds, reserve pits would be constructed to allow for a minimum of 2 feet of free board between the maximum fluid level and the top of the pit's berm. In addition to the berm, catchments would be excavated around the pits to prevent the infiltration of stormwater. Also, the reserve pit will not be located in natural drainages where a flood hazard exists or surface runoff will destroy or damage the pit walls. To prevent leakage of the reserve pit contents to the subsurface, the reserve pit will be lined with 12 ml reinforced UV- and hydrocarbon-resistant synthetic liner with a permeability greater than or equal to 1×10^{-7} cm/sec. The top of the liner will be buried in the pit berms, and if rocks are jutting from the pit walls, bedding material may be installed to protect the liner material.

Within 90 days after termination of drilling and completion activities, the liquid contents of the reserve pit will be removed and disposed of at an approved waste disposal facility. Any hydrocarbons in the reserve pit would be removed in accordance with 43 CFR 3162.7. The reserve pit would then be completely dried and all cans, barrels, pipe, etc. would be removed. The accessible portion of pit liner would be removed to the local landfill and the remaining buried part of liner would be backfilled in place with native soils and materials. The backfilling of the reserve pit would be done in such a manner that the mud and associated solids would be confined to the pit and not squeezed out and incorporated into the surface materials. The backfilled pit would be covered with a minimum of 3 feet of overburden. When work is complete, the pit area would support heavy equipment without sinking.

Produced water and gas condensate from separation/dehydration units will be stored in separate tanks at the pad. The tanks would have 300- to 400-barrel capacities. The produced water may also be transported by buried fiberglass pipe to a centralized tank battery. Produced water is typically high in salinity and may contain other contaminants. Gas condensate, which resembles light crude oil, is composed of hydrocarbons in a liquid state. Potential releases of produced water and gas condensate could occur from tanking, piping, and transport trucks. This could be the result of an accident, or tank/piping failure.

Tank batteries for the storage of produced water and gas condensate would be placed in secondary containment to prevent migration of contaminants offsite. These may consist of either corrugated steel surrounds, earthen berms, or both. Earthen berms surrounding the tank batteries would be compacted to prevent lateral movement of fluids through the utilized materials. In the event of an accidental release, produced water and condensate would be confined for cleanup in the secondary containment area and would not migrate to surrounding soils and water. Secondary containment would be sized to contain a minimum of 110 percent of the storage capacity of all tanks within the berm. All loading lines would also be placed inside the containment berm.

Fuels, lubricants and other hazardous materials would be temporarily stored in transportable containment trailers or tanks on the proposed well pads. All hazardous materials would be handled in an appropriate manner to minimize the potential for leaks or spills to the environment.

Any release (leaks or spills) of hazardous substances in excess of the reportable quantity, as established by 40 CFR Part 117, be it a result of an accident or tank/piping failure, would be reported as required by the CERCLA of 1980, as amended. In addition, all releases to soil or water of 10 gallons or more of any substance would be immediately reported verbally to the BLM and proof of cleanup provided for the project record. EnCana would implement a Spill Prevention, Control, and Countermeasure (SPCC) Plan to minimize potential impacts from unintentional releases. Spill reporting and cleanup would be

applicable to all stages of the project including drilling, completion, operation, and abandonment of the wells.

In consideration of these precautionary measures, impacts to human health and natural resources from the accidental release of solid or hazardous wastes is considered remote.

No Action Alternative

Potential impacts of the no action alternative would be similar to the proposed action. However, the no action alternative is associated with developments that are of a much smaller scale than the proposed action. Therefore, there is less potential for environmental impacts associated with the release of hazardous or solid waste.

Water Quality, Surface and Ground (includes an analysis of Public Land Health Standard 5)

Affected Environment

Surface Water

The OMDP area comprises portions of nine distinct subwatersheds. These include 36 acres of the Sand Wash subwatershed, 191 acres of the Wallace Creek subwatershed, the 639 acres of Colorado River below Rifle Creek subwatershed, 737 acres of the Little Horsethief Creek subwatershed, 907 acres of the Alkali Creek subwatershed, 1,466 acres of the Little Alkali Creek subwatershed, 1,565 acres of the Moffat gulch subwatershed, 2,645 acres of the Smith Gulch subwatershed, and 3,849 acres of the Horsethief Creek subwatershed. All creeks within the action area are directly tributary to the Colorado River (Figure 4). Streamflows in these creeks are influenced heavily by seasonal storm and snowmelt runoff.

The State of Colorado has developed *Stream Classifications and Water Quality Standards* (CDPHE, Water Quality Control Commission, Regulation No. 37) that identify beneficial uses of water and numeric standards used to determine allowable concentrations of water quality parameters. While the ephemeral drainages within the proposed action area do not fall into any particular segment; Alkali and Little Alkali Creeks and Horsethief and Little Horsethief Creeks are within the Lower Colorado River Basin segment 13a that includes all tributaries to the Colorado River from a point immediately below the confluence of Parachute Creek to the Colorado/Utah border. This segment has been designated as a use-protected stream segment. The use-protected designation refers to waters that the State of Colorado has determined do not warrant the level of protection provided by the outstanding waters designation or the antidegradation rule (CDPHE, Water Quality Control Commission, Regulation No. 31).

Waters within segment 13a are classified aquatic life warm 2, recreation 1b, and agriculture. Aquatic life warm class 2 refers to waters not capable of sustaining a wide variety of cold or warm water biota due to habitat, flows, or uncorrectable water quality conditions. Recreation class 1b refers to stream segments where there is a potential for primary contact recreation. The agriculture class refers to waters that are suitable for irrigation or livestock use. Numeric standards include a comprehensive list of physical, biological, inorganic, and metal standards that have been established to protect the designated uses above. At this time, no water quality data are available for any of the creeks within the action area.

Waters of the U.S.

All of the major and minor streams as depicted in Figure 4 would be considered waters of the U.S. as defined by Section 404 of the Clean Water Act (33 CFR part 328) and are regulated by the U.S. Army

Corps of Engineers. These streams have a defined bed and bank that vary in width from 1 to 15 feet and are tributary to the Colorado River. As described in the "Wetlands and Riparian Zones" section below, these streams generally lack any wetland development although scattered hydrophytes and riparian plants do occur.

Groundwater

The Piceance Basin is located within the Division of Water Resources (DWR) Water Division 5, the Colorado River Basin Main Stem. The Piceance Basin contains both alluvial and bedrock aquifers. Unconsolidated alluvial aquifers are the most productive aquifers in the Piceance Basin (EPA 2004). The groundwater exists in shallow, unconsolidated alluvium associated with the Colorado River (BLM 2006) and consists of unconsolidated boulders, cobbles, gravel, sand, silt, and clay. The thickness of the alluvium is variable, but tends to be thinner in the upper reaches and thicker in the lower reaches. Generally, alluvial well depths are less than 200 feet and typically water levels range from 50 to 100 feet. The quality of alluvial groundwater in the Colorado River Basin can vary widely, and is affected by return flow quality, mineral weathering and dissolution, cation-anion exchange with alluvial minerals, and organic compound loading from fertilizer and pesticide leaching.

The most important bedrock aquifers are known as the upper and lower Piceance Basin aquifer systems (EPA 2004). These consolidated bedrock aquifers occur within and above the large oil shale reserves. The upper and lower aquifers are separated by the Mahogany Zone of the Parachute Creek Member of the Tertiary Green River Formation. The Mahogany Zone is a poorly permeable oil shale, which effectively serves as an aquitard. Both bedrock aquifers overlie the older Cretaceous Mesaverde Group, the target zone of the proposed wells located within the OMDP boundary. South of the Colorado River, these upper Tertiary-age aquifers have largely been eroded off, exposing the lower Green River and Wasatch Formations. As such, most water supply wells in the southern portion of the Piceance Basin are completed in the alluvial aquifers associated with the Colorado and Gunnison River tributaries (Colorado Geological Survey 2003).

Groundwater is recharged from snowmelt in upland areas that receive more precipitation than lower altitude areas (EPA 2004). In the Piceance Basin, recharge flows from areas near the margins of the basin to discharge areas near principal stream valleys. The groundwater moves laterally and/or upward discharging directly into streams, springs, and seeps by upward movement through confining layers and into overlying aquifers or by withdrawal from wells (USGS 2007a). The natural discharge areas generally are found along the Colorado River and its tributaries (USGS 2007b).

Although the Mesaverde Group contains some water-bearing intervals (Glover et al. 1998), the depth to the top of the Mesaverde Group aquifer beneath the project area is more than 5,000 feet below ground surface (bgs). The water quality of this aquifer is considered poor due to the presence of the minerals nahcolite ($NaHCO_3$, sodium bicarbonate), dawsonite ($NaAl(OH)_2CO_3$), and halite (NaCl), with total dissolved solids (TDS) ranging from less than 1,000 milligrams per liter in many of the basin margin areas to more than 10,000 milligrams per liter in the central part of the Piceance Basin (EPA 2004).

According to the Colorado Division of Water Resources (DWR), there are seven shallow fresh water wells located within the extreme eastern portion of Section 10 T8S R96W. These wells range in depth between 125 and 280 feet, with water levels ranging between 78 and 181 feet. Well yields were found between 8 and 15 gallons per minute (gpm). The wells are likely completed in the Wasatch Formation or surface alluvium. The use of the wells is primarily domestic; therefore it can be assumed that the quality of the water is fit for human consumption.

Environmental Consequences

Proposed Action

Environmental Consequences: Potential impacts to groundwater resources from the proposed action would include contamination of the groundwater with produced water, drilling mud, and petroleum constituents. Hydraulic fracturing (fracing) would be incorporated to complete the wells, which would include produced and freshwater mixed with proppants, or propping agents, to stimulate the formation to create fractures that would allow gas to travel more freely from the rock pores where the gas is trapped. It has been demonstrated that the effects of hydrofracturing would not extend beyond 500 feet from the well bore in the Piceance Basin (Wright Water Engineers 2003). Hydrofracturing would be conducted at 5,000 feet or more below ground surface, and would be unlikely to cause impacts to groundwater resources near the surface, such as springs or shallow alluvium. However, isolation of any water bearing zones during installation of the production casing would minimize the effects, as well as cementing the production casing to 200 feet above the top of the Mesaverde Group. It is highly unlikely that any deep groundwater resources would be affected, as the thick impermeable layers of rock at the top of the Williams Fork Formation would prevent water or hydrocarbons from migrating to potable water zones.

Surface Water

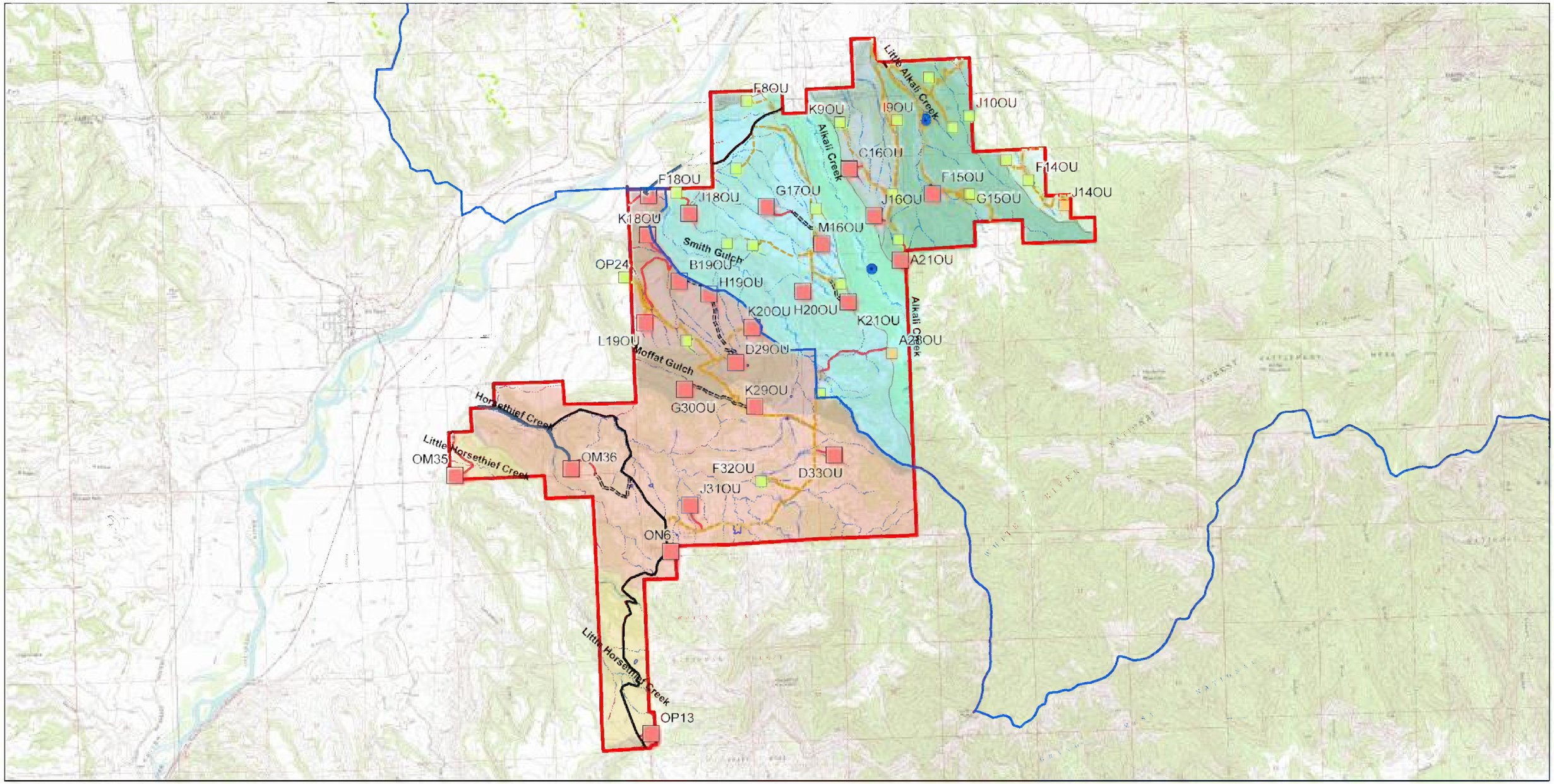
Potential impacts to surface water associated with the proposed action include increased erosion and sedimentation of streams due to changes in channel morphology changes due to road and pipeline crossings, and contamination by drilling fluids, produced water, or condensate. Erosion and sedimentation are particular concerns because many of the proposed developments would occur on fragile soils (see **Soils**). Surface waters would be most susceptible to sedimentation during construction, drilling, and completion activities, which would collectively last approximately 30 to 45 days. After this period, reclamation activities would substantially reduce surface exposure, decreasing the risk to surface waters over the long term.

Although surface waters would be most susceptible to sedimentation over the short term, access roads would remain in place over the life of the well (i.e., 20 to 30 years) and would channel runoff during periods of precipitation. Sedimentation and stream channel impacts associated with roads would be reduced through the implementation of Best Management Practices (BMPs) and other preventative measures. As proposed, these measures would include limiting cut slope steepness, step-cutting, limiting road grade to 10%, crowning road surfaces, and installing culverts and drainage systems.

Other elements of the proposed action are designed to mitigate risks to surface waters associated with the release of drilling fluids, produced water, and condensate. The reserve pit used to contain drilling fluids would be lined to prevent infiltration into surrounding soils. Once completion operations are complete, excess liquids would be allowed to evaporate and backfilling of the pit would be performed in a manner that would avoid incorporating the mud into surface soils.

Tanks used to store produced water and condensate would be placed in secondary containment to prevent offsite release. In the event of an accidental release, produced water and condensate would be confined for cleanup in a containment area and would not migrate to surrounding soils or surface waters. Pipelines associated with the transport of these liquids would be pressure tested to detect leakage prior to use.

Refer to Appendix D (GJFO Nos. 3, 9 & 18 and GSEO No. 13) for standard Conditions of Approval that would mitigate impacts to surface water. Through the use of COAs and BMPs associated with construction activities, prompt interim reclamation, and the preventative measures associated with the treatment of fluids, impacts to surface waters would be minimized and should be minor.



Legend

SubWatershed GSFO
- Wallace Ck
- Little Alkali Ck
- Alkali Ck
- Colorado Rvr below Rifle
- Smith Gulch

SubWatershed GJFO
- Smith Gulch
- Horse Thief Ck
- Little Horsethief Ck
- Sand Wash
- Spring
- Ponds & Wetlands
- Intermittent Streams

- OMDP Boundary
- GJFO GSFO Boundary
- Approved Well Pad
- Existing Well Pad
- Proposed Well Pad
- Existing Road
- Road Needing Improvement
- New Road
- County Road
- Proposed Pipeline

1 inch equals 5,333 feet
Scale: 1:64,000
Countour Interval: 40 ft
Date: September 2008

Figure 4: Riparian Habitats, Wetlands, Streams & SubWatersheds.

BASE: U.S.G.S. 7.5 Minute
DeBeque, Grand Valley, Housetop Mountain, and Red Pinnacle, Colorado Quadrangles

Note: Well Pads Not to Scale

Note: Areas outside of Range Allotments are private lands.

N W E S

0 1 2 Miles

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Waters of the U.S.

Section 404 of the Clean Water Act requires a Department of the Army permit prior to discharging dredged or fill material into waters of the United States as defined by 33 CFR Part 328. A Corps permit is required for both permanent and temporary discharges into waters of the United States. However, at-grade low water crossings are generally exempt from permitting unless the low water crossing involves the placement of rip-rap or other structures into the stream channel (Nall, personal communication). Installation of culverts into waters of the U.S. would be considered a temporary impact and would require a Corps permit. Drainage crossings within the project area would be required to pass a 25-year or greater storm event in accordance with *Surface Operating Standards for Oil and Gas Exploration & Development* (USDI and USDA 2006). However, the Corps of Engineers strongly recommends designing all crossings for the 100-year event due to flashy nature of the streams and anticipated culvert maintenance. The 25-year, 6-hour precipitation event for the proposed action area is approximately 1.6 inches and the 25-year 24-hour precipitation event is approximately 2.2 inches.

Drainage crossings within the project area would consist of culvert and low-water crossings of several streams and their ephemeral tributaries including: Little Horsethief Creek, Horsethief Creek, Moffat Gulch, Smith Gulch, Alkali Creek, and Little Alkali Creek. However, the majority of these crossings are very small and would probably be low-water crossings. Newly constructed roads to three of the well pads in the proposed action (Pads OM35, F15OU, and K18OU) would cross larger stream channels. Based on field reconnaissance in the fall of 2006, the road to OM35 would cross Little Horsethief Creek, an ephemeral drainage 3 feet wide; the road to F15OU would cross Little Alkali Creek, which is 6 to 8 feet wide at the point of crossing; and the road to K18OU would cross an ephemeral tributary to Smith Gulch, which is 2 to 3 feet wide. No wetland or riparian habitat is present at any of these crossings; however, there are isolated cottonwoods *(Populus deltoides)* and scattered stands of tamarisk *(Tamarisk parviflora)* near the crossing of Little Alkali Creek. Finally, one of the well pads, ON6, would impact a deeply incised manmade drainage ditch. However, this ditch was deemed to be non-jurisdictional by the U.S. Army Corps of Engineers during an onsite meeting with Ms. Rea Orthner of Western Ecological Resource, Inc. and representatives of the GSEO and GJFO on April 20, 2007.

As a standard condition of approval, EnCana would obtain all necessary Corps permits prior to working in these drainages. In addition, due to the proximity of the OMDP project area to the Colorado River, riprap and revegetation practices should be used to stabilize road fills at all major crossings. Improperly designed drainage crossings, in particular undersized culverts and poorly aligned culverts, could result in channel degradation that may include: excessive bank erosion at culvert outlets, ponding of flows and excess sedimentation at culvert inlets, and channel scour both at inlets and outlets. The standard conditions of approval listed in Appendix D (GJFO Nos. 3 & 9 and GSEO No. 15) would be implemented to protect waters of the U.S. In addition, the deeply incised drainage ditch at ON6 would be re-routed into its original natural drainage in order to prevent further erosion and land degradation. The site-specific COAs are found in Appendix F.

Groundwater

Potential impacts to groundwater resources following implementation of the proposed action include contamination of groundwater from drilling fluids or petroleum constituents. Isolation of water-bearing formations during the installation of production casing would be required to minimize the potential for adverse effects. Any shallow groundwater zones encountered during drilling of the proposed wells would be properly protected, and the presence of these zones reported to the BLM and Colorado Oil and Gas Conservation Commission (COGCC).

To accommodate protection and isolation of usable water zones, 8 5/8 -inch surface casing would be set at 1,500 feet, below the average depth of known aquifers. Cement would be circulated to surface to assure an adequate seal between the pipe and the rock formations. The 4½-inch production casing would be set at total depth of the well, and cement volumes will be sufficient to fill the annulus between the rock formations and the exterior of the casing to 200 feet above the Mesaverde Formation (for additional information, see **Geology and Minerals**). Domestic groundwater wells are not expected to be impacted by the proposed action.

Deeper water sources within the OMDP area are not useable as aquifers since most are located greater than 5,000 feet below ground surface. In addition, a thick impermeable layer of rock in the top section of the Williams Fork Formation will not allow drilling fluids to migrate to useable water reserves.

Refer to Appendix D, GSEO Number 6 for standard conditions of approval that would mitigate impacts to ground water.

No Action Alternative

Surface Water

The types of potential impacts to surface waters would be generally similar to the proposed action. However, since very little ground disturbance would be associated and similar protective measures and BMPs would be used, potential impacts to surface water are considered negligible.

Waters of the U.S.

Under the no action alternative, there would be no additional waters of the U.S. crossings and hence no U.S. Army Corps permits would be required

Groundwater

Since the same protective measures would be employed, impacts from the no action alternative would be similar to those from the proposed action.

Analysis on the Public Land Health Standard for Water Quality: With implementation of BMPs and the use of the proposed protective measures, the proposed action and no action alternative would be unlikely to prevent water quality standards from being met.

Wetlands and Riparian Zones (includes an analysis of Public Land Health Standard 2)

Affected Environment

The OMDP project area is dissected by seven drainages, which are all tributary to the Colorado River. From southwest to northeast these include: Little Horsethief Creek, Horsethief Creek, Moffat Gulch, Smith Gulch, Alkali Creek, Little Alkali Creek, and Wallace Creek. All of these drainages are intermittent and flow during snowmelt runoff and large precipitation events. No mapped Federal Emergency Management Agency (FEMA) floodplains are present within the project area; however, each of the streams in the OMDP project area does have a small floodplain that varies in size depending on local topography and stream flow volumes. Riparian and wetland habitat was observed along the Little Alkali Creek, and the BLM has mapped riparian habitat along Smith Gulch. In addition, there are eleven stock ponds on the project site, two wetlands, and two mapped USGS springs. Figure 4 illustrates the

location of these streams, wetlands and riparian habitat within the OMDP project area, and each is described below.

Little Horsethief Creek – This intermittent drainage occurs in the western and southwestern portions of the project site in the vicinity of pads OM35 and OP13. No riparian or wetland habitat is present. Along the lower reaches of the stream, the bed is approximately 3 feet wide, while at the higher elevations it is only one to 2 feet wide. The stream is flanked by Utah juniper woodlands *(Juniperus osteosperma)*, basin big sagebrush shrublands *(Artemisia tridentata var. tridentata)*, and greasewood shrublands *(Sarcobatus vermiculatus)*.

Horsethief Creek – This intermittent drainage occurs along the main access road (County Road V.00) into the OMDP project area. At the northern reaches of this creek, the braided channel is 2 to 6 feet wide and has a 40 to 60 feet wide floodplain. However, the floodplain and channel narrow further to the south as the elevation increases. In areas of steep topography, the channel is well defined and incised 5 to 10 feet. Finally, at the highest reaches of the stream in the OMDP project area, the channel is only 1 to 2 feet wide and has a 10 feet wide floodplain at most. There are two low water crossings of Horsethief Creek, one along County Road V and the other along an existing access road in the vicinity of pad F32OU. There are no wetlands or riparian habitat along Horsethief Creek, although scattered wetland and riparian plants do occur. These include scattered tamarisk *(Tamarisk parviflora)*, alkali muhly (*Muhlenbergia asperifolia)*, and Baltic rush *(Juncus balticus)*. Other vegetation observed include singleleaf ash *(Fraxinus anomala)*, Utah Juniper, greasewood, basin big sagebrush, rubber rabbitbrush *(Chrysothamnus nauseosus)*, and snakeweed *(Gutierrezia sarothrae)*.

Moffat Gulch – Moffat Gulch is an intermittent stream with no wetland or riparian habitat development. This narrow, 1 to 2 feet wide ill-defined channel is flanked by juniper woodlands with big sagebrush, snakeweed, and cheatgrass *(Anisantha tectorum)*.

Smith Gulch – Smith Gulch is an intermittent stream located between Lucus Mesa and Samson Mesa. In the vicinity of existing pad E28OU, the creek has a 2 feet wide stream channel and banks incised 15 to 20 feet in places. A juniper woodland flanks this drainage and supports a sparse understory represented by rubber rabbitbrush, greasewood, Patterson's milkvetch *(Astragalus pattersonii)*, and miner's candle *(Oreocarya sp.)*. Further to the north along Smith Gulch, the BLM has mapped riparian habitat as part of their No Surface Occupancy Oil & Gas Stipulation for riparian and Wetland Zones (NSO #2). However, no field verification of this riparian habitat was made.

Alkali Creek – This sinuous intermittent stream channel, located between Samson Mesa and Creek Mesa, has a bed width that varies from 3 to 6 feet. The headwaters of this stream originate in the White River National Forest in the vicinity of Housetop Mountain. At the time of assessment in early October 2006, there was a small flow of water in the stream and evidence of debris flow. No wetland or riparian habitat is present, however there are isolated cottonwood trees *(Populus deltoides)*, and tamarisk. The benches above the floodplain are dominated by rubber rabbitbrush, greasewood, basin big sagebrush, shadscale, and Utah juniper.

Little Alkali Creek – Little Alkali Creek occurs in the eastern portion of the OMDP project area between Alkali Creek and Wallace Creek. The northern 3,500 linear feet of this 2 to 3 feet wide intermittent creek contains a marginal wetland habitat about 10 feet wide and a riparian habitat about 20 feet wide. Woody wetland vegetation observed include scattered stands of sandbar willow *(Salix exigua)*, tamarisk shrubs, and isolated cottonwood trees. The herbaceous wetland component is dominated by three-square *(Scirpus pungens)* and alkali muhly, which are native plants, and non-natives including barnyard grass *(Echinochloa crus-galli)*, and rabbitfoot grass *(Polypogon monspeliensis)*. Less common are cattails *(Typha latifolia)*, creeping spikerush *(Eleocharis macrostachya)*, and water buttercup *(Ranunculus sp.)*,

which are wetland plants; and facultative and upland plants including cocklebur *(Xanthium strumarium)*, wild licorice *(Glycyrrhiza lepidota)*, and gray aster *(Eucephalus glaucus)*. Like other streams in the area, Little Alkali Creek is flanked by stands of greasewood and basin big sagebrush with rubber rabbitbrush and shadscale. An existing road borders this stream which was likely improved for the Orchard Unit Project. Along the upper reaches of this creek in the vicinity of existing pad G15OU, the BLM has mapped riparian habitat as part of the No Surface Occupancy Oil & Gas Stipulation for Riparian and Wetland Zones (NSO #2).

Wallace Creek – One small, ill-defined tributary to Wallace Creek occurs in the eastern portion of the OMDP project area. This intermittent stream contains no wetlands or riparian habitat and is instead flanked by basin big sagebrush and Utah juniper, with numerous weeds such as cheatgrass, Russian-thistle *(Salsola australis)*, and tumble mustard *(Sisymbrium altissimum)*.

Stock Ponds & Wetlands - Eleven stock ponds occur within the OMDP project area both on private and on BLM lands, and these ponds vary in depth, persistence of ponding, as well as composition of surrounding vegetation. One of these stock ponds, labeled as Piute Reservoir on the USGS 7.5-minute topographic quadrangle map in the vicinity of pad ON6, appears to have been abandoned. Some of the larger stock ponds support concentric rings of tamarisk, sandbar willow, and isolated cottonwoods. Smaller stock ponds are surrounded by adjacent upland vegetation types, usually sagebrush and greasewood shrublands. During dry portions of the year, the vegetation on the bottom of many stock ponds is comprised of a ring of creeping spikerush, a wetland plant, and weeds such as cocklebur, prickly lettuce (*Lactuca serriola*), and cheatgrass. In addition to the eleven stock ponds, there are two recently constructed Water Saver Habitat Improvement Facilities in the vicinity of proposed pad D29OU on Lucus Mesa (Lucus Mesa Catchment 1 & Lucus Mesa Catchment 2).

Two herbaceous wetlands were found within the OMDP project area in addition to the wetlands along Little Alkali Creek. Approximately 3,000 feet east of Piute Reservoir is a large four acre cattail wetland, which appears to have been artificially formed by water ponding behind Horsethief Creek Road, which lacks any culverts. This herbaceous wetland is dominated by broadleaf cattail *(Typha latifolia)*, however three-square, creeping spikerush, rabbitfoot grass, and foxtail barley *(Hordeum jubatum)* also occur. Around the edges of the wetland there are stands of tamarisk, scattered cottonwood seedlings, and weeds such as cocklebur, sticky Gumweed *(Grindelia squarrosa)*, clasping pepperweed *(Lepidium perfoliatum)*, and kochia *(Kochia scoparia)*.

The second wetland occurs at a natural seep in sandstone rocks along County Road V (UTM NAD 83 Z12N 4355938N 744630E). This small wetland is dominated by alkali bulrush *(Bolboschoenus maritimus)* and inland saltgrass *(Distichlis spicata)*, and surrounded by a greasewood shrubland.

Finally, two springs are shown on the United States Geological Survey (USGS) 7.5-minute topographic quadrangle map: One along Alkali Creek, and one along Little Alkali Creek. However, these springs were not visited, and the extent of hydrophytic vegetation around them is not known. According to GIS data provided by the GJFO, the Alkali Creek spring is designated as East Devil's Spring and has associated water rights.

Environmental Consequences

Proposed Action

No Surface Occupancy (NSO) and Controlled Surface Use (CSU) stipulations are commonly used to protect riparian and wetland zones for new oil and gas leases. Lease COC64191 has both NSO and CSU Stipulations for riparian/wetland zones. These stipulations state that activities associated with oil and gas

development are to be restricted to an area beyond the outer edge of riparian vegetation, and that such activities may require special design, construction, and implementation measures within 500 feet of the outer edge of riparian or wetland vegetation (see Table 18 in the **Vegetation** section).

Under the proposed action, there would be no impacts to riparian and wetland habitats or within 500 feet of the outer edge of riparian or wetland vegetation. However, several of the OMDP pads and roads would be constructed in close proximity to existing stock ponds and other water-related range improvements. More specifically, proposed pad D29OU and its road would be constructed adjacent to the Water Saver Habitat Improvement Facility on Lucus Mesa. The eastern portion of the road to OM36 would be located about 100 feet from the edge of a stock pond, and finally, the edge of disturbance for proposed pad ON6 would be located about 400 feet south of an existing stock pond.

The proposed action would result in three temporary impacts to intermittent streams with bankfull widths greater than 2-3 feet, associated with either at-grade low water crossings and/or the installation of drainage culverts for road crossings and collocated pipelines. There would be also be a few temporary impacts to very small ephemeral drainages 1- to 2-feet wide, mainly located on Lucus, Samson, and Creek Mesas. See section on Water Quality Surface & Ground. No FEMA mapped floodplains would be impacted by the proposed action, no wetlands or riparian habitats would be impacted, and no springs would be impacted.

Analysis on the Public Land Health Standard No. 2 for Riparian Systems. A Land Health Assessment was completed in 2000 for the Battlement Mesa Area, which included a portion of the OMDP project area (BLM 2000). Only Little Alkali Creek and Alkali Creek were assessed for Standard No. 2 for riparian systems; however, they were both found to be non-riparian. As no wetland or riparian habitats are to be affected by the proposed action, there would be no effect on the Public Land Health Standard No. 2 for Riparian Systems.

No Action Alternative

Under the No Action Alternative, the existing road along Little Alkali Creek would continue to be used for access to well pads developed under the OMDP, and potential indirect effects due to sedimentation from stormwater runoff could conceivably still occur. However, no such effects were observed during an onsite inspection in fall 2006.

Other Affected Resources

In addition to the critical elements, the resources listed in Table 12 were considered for impact analysis relative to the proposed action and no action alternative. Resources that would be affected by the proposed action and no action alternative are discussed below.

Table 12. Other Resources Considered in the Analysis.

Resource	NA or Not Present	Present and Not Affected	Present and Affected
Access and Transportation			X
Cadastral Survey	X		
Fire/Fuels Management		X	
Forest Management	X		
Geology and Minerals			X
Law Enforcement	X		

Table 12. Other Resources Considered in the Analysis.			
Resource	**NA or Not Present**	**Present and Not Affected**	**Present and Affected**
Paleontology		X	
Noise			X
Realty Authorizations			X
Recreation			X
Socio-Economics			X
Soils			X
Vegetation			X
Visual Resources			X
Wildlife, Aquatic			X
Wildlife, Terrestrial			X

Access and Transportation

Affected Environment

I-70 provides regional access through Garfield County to the Orchard II Master Development Plan (OMDP) project area. Primary access would be provided from I-70 at the DeBeque exit (Exit 62). Three existing county roads would be used to access the OMDP area – Mesa County Roads V.00 and V.50 and Garfield County Road 306 (CR306).

Mesa County Road V.00 (CR V.00) would serve existing and proposed well pads along Horsethief Creek and would provide primary access to that portion of the project area administered by the GJFO. Mesa County Road V.50 (CR V.50) would serve well pads proposed on the DeBeque Wildlife Area (Bureau of Reclamation property) and Samson Mesa. Mesa County has not collected traffic volume data for these roads, but has indicated that current volumes are light. The existing bridge over the Colorado River at Road V.5 was closed in October 2007 for repairs, and a date for reopening has not been identified (Mesa County 2008).

Well pad sites within the Creek Mesa and Little Alkali Creek areas of the project area would be served by Garfield County Road 306 (CR 306) south of the Una Bridge area. These existing roads are open for public use, and are designated as preferred haul routes by the county for use by drilling, construction, and operations traffic. Typically, existing traffic volumes on both roads is light. Average daily trips (ADT) in 2002 on CR 306 ranged from 48 to 265 on sections of the roadway that would be used for project traffic.

Traffic volumes on these roads have increased over recent years due to increased oil and gas exploration in the project area and regionally. However, the rate of increase is unknown, and no recent traffic volume counts have been taken by either Garfield or Mesa counties. Garfield County requires permits for oversized and overweight vehicles. County Road 306 has a weight restriction that limits trucks to no more than 80,000 pounds gross vehicle weight (Garfield County 2008). Mesa County posts weight limit signs on a seasonal basis. During seasonal restrictions, county permits must be obtained for overweight vehicles.

Environmental Consequences

Proposed Action

Under the proposed action, substantial short-term increases in the volume of both heavy and light traffic would occur during the construction, drilling, and completion phases of the project. To construct, drill and complete each well an average of 16 light truck trips and 8 heavy truck trips per day would be required. Assuming that wells would take 12 to 15 days to drill and 30 to 45 days to complete, the development of each well would require between 672 and 960 light truck trips and between 336 and 480 heavy truck trips. If all proposed wells are eventually developed (93 wells from 24 new pads), more than 63,000 light truck trips and 32,000 heavy truck trips would occur over a 2-to-3 year period.

Once wells are completed, the volume of traffic would decrease dramatically. During the 20-to-30-year operations phase of the project, project-related traffic would be limited to a weekly visit to each well pad for inspection and maintenance. Pipelines or tanker trucks would remove condensate from the storage tanks on the well pads at rates ranging from 1-2 times per day to once per week. Each well may be recompleted once per year, requiring approximately three to five truck trips per day for approximately seven days.

Traffic in and out of the OMDP would be along Mesa CR V.00 and CR V.50 and on Garfield CR 306. These roads would remain open for public use. Potential impacts to travel and access of other land users during the construction/drilling phase and recompletion/workover activities would include temporary conflicts with normal traffic, including travel delays and increased vehicle collision rates. Degradation of the road surface may occur due to heavy equipment travel and fugitive dust and noise would be created. After all drilling and completion is finished, traffic levels would decline substantially on these local roads.

Approximately 8.76 miles of new two-track road would be constructed to provide required well pad access. The roads would be constructed to meet the standards of the anticipated traffic flow and all-weather requirements. Construction would include ditching, draining, crowning and capping or sloping and dipping the roadbed as necessary to meet county road standards. Traffic control gates will be installed at access points to existing pads located on private lands within the GJFO jurisdiction (F32OU and OP13). This is currently in place for existing pads (F8OU, G18OU, C17OU, N17OU, and M17OU) on private lands within the jurisdiction of the GSEO. Public access to existing wells located on public lands (L16OU and F21OU) will be maintained. Public access will be controlled at the F18OU pad (see Appendix F). A traffic control gate will also be installed to the access point for the planned A28OU pad. This pad is located just north of the E28OU pad which has public access from CR V.0. An existing gate on private land currently controls access to existing pads H16OU and P16OU located on private lands.

Typically, pipelines would be buried alongside proposed access roads, resulting in a total width of short-term disturbance of approximately 75 feet. This disturbance would be reduced to a 20-foot-wide finished road surface (including bar ditches) after reclamation. Total short-term disturbance resulting from the road and adjacent pipeline is estimated at 110.2 acres. Because the pipeline areas would be reclaimed, no long-term disturbance would result from the adjacent pipelines. Total long-term disturbance from finished road surfaces is estimated at 66.6 acres.

Roadway construction would result in impacts to natural resources, including soil disturbance and compaction, removal of vegetation, potential erosion and stream sedimentation, noxious weed and non-native species invasion into disturbed areas and fragmentation of wildlife habitat. However, BLM road design standards would be applied to BLM-managed lands, reducing impacts by including drainage features such as culverts and ditches, minimizing earthwork and sidecast of materials and incorporating

dust abatement measures. BLM road maintenance standards would also be applied, including necessary road surface blading, culvert and ditch cleaning, spot surfacing and weed control (BLM Manual 9113).

Refer to Appendix D (GSEO No. 15) for mitigation measures applicable to Transportation resources.

No Action Alternative

A much smaller volume of traffic would be required to implement the developments associated with the no action alternative. Assuming the development of each well would require the average number of trips described above, an estimated 2,000 to 3,000 light truck trips and between 1,000 and 1,500 heavy truck trips would be required.

Commuting construction and drilling crews would be encouraged to carpool to reduce the number of vehicle trips on local area roads and associated wear and tear. A travel management plan that includes carpooling or other travel reduction strategies is strongly encouraged.

The operator would require commuting construction and drilling crews to comply with posted speed limits on public roads and limit driving speeds to 20 mph on more primitive access roads to reduce the potential for vehicle collisions and fugitive dust. By complying with posted 25 mph speed limits along County Roads, traffic-related noise would also be reduced at nearby residences.

Geology and Minerals

Affected Environment

Geology

The OMDP project area is located within the southern Piceance Basin, a broad elongate structural basin located at the eastern edge of the Colorado Plateau. The basin is highly asymmetrical and deepest along its eastern side near the White River Uplift, where more than 20,000 feet of sedimentary rocks are present. It is bounded on the north by the Uinta Mountain uplift, on the east by the Grand Hogback Monocline, which lies along the west flank of the White River Uplift, on the southeast by the Gunnison and Uncompahgre Uplifts, and separated from the Uinta Basin to the northwest by the Douglas Creek Arch. Surface exposures in the Piceance Basin are primarily sedimentary rocks of the Green River and Wasatch Formations.

The youngest rocks in the OMDP are Quaternary in age and are distributed as unconsolidated sedimentary surface deposits. Most of the pediment gravel deposits (Qop) located on Creek Mesa and Samson Mesa consist of pebble, cobble, and boulder gravel siltstone, sandstone, and claystone with some basalt boulders and variable amounts of sedimentary rock.

Surface deposits in much of the OMDP area are composed of alluvial and floodplain deposits (Qal), alluvial and aeolian sand and silt (Qass), alluvial terrace and valley fill deposits (Qga), and pediment gravel deposits (Qop) underlain by the Shire Member of the Wasatch Formation (Tws).

The Mesaverde Group lies unconformably below the Wasatch Formation. The Mesaverde can be over 7,000 feet thick within the Piceance Basin but within the OMDP is estimated to be approximately 5,000 feet thick. The Mesaverde Group is often called the Mesaverde "Formation" and includes informal subdivisions based on gas productivity characteristics. These include the barren Ohio Creek Formation; the stacked lenticular, fluvial sandstones, sandy shales, carbonaceous shales and coals of the Williams Fork Formation; and the underlying marine sandstones and shales of the Iles Formation.

Mineral Resources

Mineral resources within the southern portion of the Piceance Basin include oil and gas deposits, coal, and minor sand and gravel. Oil and gas production is generally from unconventional tight sands. The proposed OMDP drilling project would target sandstone layers within the Williams Fork (including the Cameo Coal and un-named sandstones) between 7,200 and 10,000 feet TVD. The Williams Fork Formation sandstones are considered "tight" because of their low permeability reservoir characteristics. Individual sandstones are stacked and concentrated into 400- to 500-foot-thick potentially productive sequences, and distributed throughout a vertical interval of about 3,000 feet. Sand bodies originating from a river or fluvial depositional setting typically demonstrate irregular and spatially limited reservoir distributions. Studies of the Rulison Gas Field, located north and east of the project area, show that these Williams Fork sandstones have limited horizontal extent, based on the lack of pressure communication between existing wells spaced less than 1,000 feet apart (Vargas 2006).

Deeper pay intervals within the lower Mesaverde include the Rollins, Cozette, and Corcoran sands. Most of the gas reservoirs also produce varying amounts of oil/gas condensate. The OMDP includes up to 25 new surface locations and one existing location required to directionally drill to a total of 95 bottomhole locations for natural gas from sands of the Williams Fork.

The entire project area is underlain by the Cameo-Fairfield Coal group of the Williams Fork Formation. However, there are currently no coal leases within the project area. Subsurface depth to coal zones is predicted to be greater than 6,000 feet within the OMDP area, and mining depths generally do not exceed 3,000 feet.

Coalbed natural gas production has been cited above depths of 7,000 feet within the Piceance Basin (RMAG 2003). Because these coal beds may contain natural gas, there is potential for future gas production from upper Mesaverde/Coal Ridge section coal beds where permeability has been preserved. However, coalbed natural gas production is (among other parameters) limited by rock permeability, which decreases with depth.

Limited amounts of salable mineral resources are located within the project area. These minerals include sand and gravel found in Quaternary deposits located along the stream valleys and in terrace deposits on mesa tops. According to the Colorado Geological Survey (CGS 1999) these deposits are of little commercial value because the gravels contain abundant silt and clay matrix and secondary calcium carbonate cements

Environmental Consequences

Fragile Soils

Numerous leases in the OMDP have lease stipulations of "fragile soils with performance requirements." The thickness of soils on top of bedrock and the angle of the contact between soil and bedrock will be taken into account during design and construction of the roadway.

Slope Stability

The sloping contact between overlying soil and the Shire Member (Tws) of the Wasatch Formation may constitute a plane of weakness which could cause slope instability along proposed roads in areas of steep slopes. Additional stabilization may be required for road cuts in steep slopes where there is thick soil over clay-rich bedrock.

Gas Production

If the proposed OMDP project wells were to become productive, implementation of the Proposed Action would result in natural gas and associated water being produced from the hydrocarbon-producing sands within the Mesaverde Group. The amount of natural gas that may be potentially produced from the proposed wells cannot be estimated accurately, but in nearby fields reserves have been estimated to approach 2 bcf per well (Vargas 2006). However, if the wells become productive, initial production rates would be expected to be highest during the first few years of production, then steadily decline during the remainder of the wells' economic life. Natural gas production from the proposed wells would contribute to the draining of hydrocarbon-bearing reservoirs within the Mesaverde Group in this area, an action that would be consistent with the BLM objectives for mineral production.

Casing programs have been designed to specifically prevent hydrocarbon migration from gas producing strata penetrated by the wellbore during drilling, initial production and after completion of the well. Identification of potential fresh-water bearing zones, aquifers, gas producing zones, and under- and over-pressured formations are incorporated into drilling scenarios for the proposed wells. Estimates of what depth these zones will be encountered are used to determine drilling fluids, fluid densities, surface casing depths and production planning. In the OMDP, the proposed casing and cementing program has been designed to protect and isolate all usable water zones, potentially productive zones, lost circulation zones, and abnormally high-pressure zones.

The specific casing depths will vary depending on well location and drilling conditions. To accommodate protection and isolation of usable water zones, 8 5/8-inch surface casing will be set at anticipated depths between 630 and 1,500 feet, below the average depth to known aquifers. Cement will be circulated to surface to assure an adequate seal between the pipe and the rock formations. The 4½-inch production casing will be set at total depth of the well and cement volumes will be sufficient to fill the annulus between the rock formations and the exterior of the casing to 200 feet above the top of the Mesaverde. If a water bearing, gas productive, lost circulation or pressured zone is encountered, cement volumes will be adjusted to isolate that zone or zones. This configuration is designed to prevent accidental contamination or leakage of hydrocarbons or fracturing fluids from reaching usable water or other productive zones within the wellbore.

No Action Alternative

Under the no action alternative, the proposed action would not be approved. No new impacts to the geology and mineral resources would occur as a consequence of selecting this alternative.

Noise

Affected Environment

Current noise levels are typical of a rural area with occasional traffic noise from oil and gas and ranching activities. Some noise is muffled by the pinyon-juniper and mountain brush vegetation common to the OMDP area. Based on this setting, estimated current background noise levels are between 35 and 45 db decibels (dB)**.** These levels are similar to a rural area at night or a recreational (park) area during the day (EPA 1974).

Noise levels reported for various elements of oil and gas development are between 50 dB(A) for the operation of typical compressor station to approximately 68 dB(A) for truck traffic and crane operation (Table 13). These levels are a function of distance; the closer to the source, the greater the noise.

Table 13. Noise Levels Associated with Oil and Gas Production and Development.	
Source	**Reported Noise Level**
Typical compressor station	50 dB(A) (375 feet from property boundary)
Pumping units	50 dB(A) (325 feet from well pad)
Fuel and water trucks	68 dB(A) (500 feet from source)
Crane for hoisting rigs	68 dB(A) (500 feet from source)
Concrete pump used during drilling	62 dB(A) (500 feet from source)
Average well construction site	65 dB(A) (500 feet from source)
Source: La Plata County (2002)	

Environmental Consequences

Proposed Action

Implementation of the proposed action would result in increased noise levels particularly during road and well pad construction, well drilling, and completion. Short-term (7 to 14 day) increases in noise levels would characterize each site associated with road and well pad construction. Based on the Inverse Square Law of Noise Propagation (Harris 1991) and an average construction site noise level of 65 dB(A) at 500 feet, construction noise would equal approximately 59 dB(A) at 1,000 feet. At 1,000 feet, noise levels would approximately those of an active commercial area (EPA 1974).

Noise impacts from drilling and completion activities would last approximately 45 to 60 days at each well. Noise would occur continuously, 24 hours per day, during the drilling and completion period. Based on a measured noise level of 68 dB(A) at 500 feet, actions associated with drilling and completion would generate approximately 55 dB(A) at 1,000 feet. This level of noise approximates that associated with light industrial activities (EPA 1974).

Traffic noise levels would also be elevated as a consequence of the proposed action. The greatest increase would be along County and BLM access roads during the drilling and completion phases. Based on the La Plata County data presented in Table 13, approximately 68 dB(A) of noise (at 500 feet) would be created by each fuel and water truck that travels these roads. Less noise would be created by smaller trucks and passenger vehicles such as pickup trucks and sport utility vehicles. Although the duration of increased noise from this source would be short, it would occur repeatedly during the drilling and completion phases.

Noise impacts would decrease during the production phase. Pumping units and compressor noise levels would be approximately 50 dB(A) at 325 to 375 feet and continued small truck traffic would generate somewhat less. These levels would be less than the construction phase, but greater than background noise levels. During maintenance and workovers, noise would increase above noise levels associated with routine well production.

Refer to Appendix D, (GSEO No. 9) for mitigation measures related to noise impacts.

No Action Alternative

The majority of noise associated with the no action alternative is based on the production/maintenance phases; only one new well would be drilled from an existing pad.

Paleontology

Affected Environment

The predominant surface formation present within the boundary of the OMDP is Wasatch Formation (including the Ft. Union equivalent at its base) and Ohio Creek Formation. Numerous isolated areas of Quaternary Gravels and Alluvium of Pre Bull Lake Age are interspersed throughout the study area and cover older Wasatch Formation sediments.

The Wasatch Formation is a BLM Condition 1 formation, defined as an area that is known to contain vertebrate fossils or noteworthy occurrences of invertebrate fossils. The Wasatch Formation is divided into the early Eocene Shire, and the Paleocene age Molina and Atwell Gulch Members. All members of the Wasatch Formation contain vertebrate fossils in varying abundances (Murphy and Daitch 2007). Rocks of the Wasatch Formation are lithologically very similar to one another throughout the Piceance Creek Basin as heterogeneous continental fluvial deposits with interfingering channel sandstone beds and overbank deposits consisting of variegated claystone, mudstone, and siltstone beds (Franczyk et al. 1990). The Shire Member of the Wasatch is mapped as the surface exposure over much of the OMDP area, and is best exposed to the west of Rifle where it outcrops as badlands at the base, to roughly one-third the way up the steep slopes of the Roan Cliffs. It is described as variegated purple, lavender, red, gray, and brown claystone, with some locally lenticular fine to coarse grained sandstone. It also contains minor conglomerate, limestone, coal, and carbonaceous shale (O'Sullivan 1986).

Fossils historically identified in the Wasatch are archaic mammals—including marsupials, representatives of two extinct orders of early mammals (pantodonts and creodonts), artiodactyls (deer-like, even-toed ungulates), ancestral horses and other perissodactyls (odd-toed ungulates), carnivores, and primates—as well as birds, lizards, turtles, crocodilians, gars and other fishes, freshwater clams, gastropods (snails), and other invertebrates (BLM 1999a) . If present, these would be vulnerable to surface-disturbing activities.

Environmental Consequences

Proposed Action

Construction activities have the potential to adversely affect scientifically important fossils. The greatest potential for impacts is associated with excavation of surficial materials and shallow bedrock. In general, alluvium and colluvium are much less likely to contain well preserved plant and animal remains than intact native sediments.

An examination of the BLM paleontology database indicate that there are known fossil deposits in a portion of the OMDP study area. Three sites are located in Section 30, T8S R96W, and two sites are found in Section 13, T9S R97W just inside the OMDP boundary. Numerous sites have been identified in Sections 22, 26, 27 and 29, T9S R96W but these areas are located outside the defined OMDP boundary. Areas covered with thick vegetation and soil cover do not usually yield fossil resources, but onsite inspections should be conducted for proposed facilities that are located on or within 200 feet of Wasatch Formation bedrock surface exposures. In the event that paleontological resources are encountered, a standard paleontological condition of approval would be attached to the APDs. Standard COAs for paleontological resources are in Appendix D (GJFO No.25 and GSEO Nos. 10 & 11).

No Action Alternative

Because of no new ground-disturbing activities, no impacts to paleontological resources would occur under the no action alternative.

Range Management

Affected Environment

The BLM permits livestock grazing on public land on five allotments in the OMDP project area. In the GSFO, the Alkali Creek Common Allotment is permitted for cattle grazing and the Alkali Gulch Allotment is permitted for sheep grazing. The entire Alkali Creek Common Allotment is located within the OMDP project area, however a small portion of the Alkali Gulch Allotment lies outside of the OMDP project area. In the GJFO, there are three grazing allotments. The Sunnyside Common Allotment is permitted for cattle grazing and approximately 70% of it lies within the OMDP project area. The Baldridge Mesa Allotment is currently unallotted, and 30% of it lies within the OMDP. Finally, the Lyons/Anderson Allotment is permitted for cattle grazing. Only 9% of this allotment lies within the OMDP (Figure 5). Table 14 summarizes the permitted grazing uses of these allotments.

Table 14. Range Management Allotments.

Allotment Name & Number	Authorization Number/Name	Livestock Kind & No.	Period of Use	Total Acres	Public Acres within OMDP	AUMs
Glenwood Springs Field Office						
Alkali Creek Common #08130	0507549	Cattle 60	5/1-5/31	2,895	2,895	60
	0507593	Cattle 93	5/1-6/15			141
Alkali Gulch #08131	0507586	Sheep 200	3/16-5/15	1,183	1,100	80
		Sheep 200	12/17-2/15			80
Grand Junction Field Office						
Sunnyside Common #06801	Kelley & Vanderleest	Cattle 66	4/16-5/31	6,552	4,628	92
	Dibrell	Cattle 165	10/18-12/25			344
	Ferguson	Cattle 56	4/16-5/31			78
	Anderson	Cattle 189	12/22-1/27			212
Baldridge Mesa #06851	Unallotted	--	--	1,560	457	--
Lyons/Anderson #16811	Long	Cattle 80	5/1-6/14	2,121	190	108
	Long	Cattle 80	10/16-11/30			110

AUMs listed are for entire allotments, portions of which may occur outside of the OMDP project area.
Alkali Creek Common Allotment will be transferred to new ownership in March 2008; table numbers reflect new ownership.

Environmental Consequences

Proposed Action

Development of the proposed OMDP would result in a total of 182.3 acres of short-term surface disturbance within the allotments and a loss of up to 18.0 Animal Unit Months (AUMs) of available livestock forage (Table 15). This loss would last for approximately 3 years or until grasses and forbs seeded during interim reclamation became productive. Long-term loss, which would last 20 to 30 years, would then be reduced to approximately 53.9 acres or 5.4 AUMs. For the GSFO, the short and long-term losses are 37.2 and 12.1 acres respectively, and for the GJFO, the losses of forage are 145.1 acres in the short term and 41.8 acres in the long term.

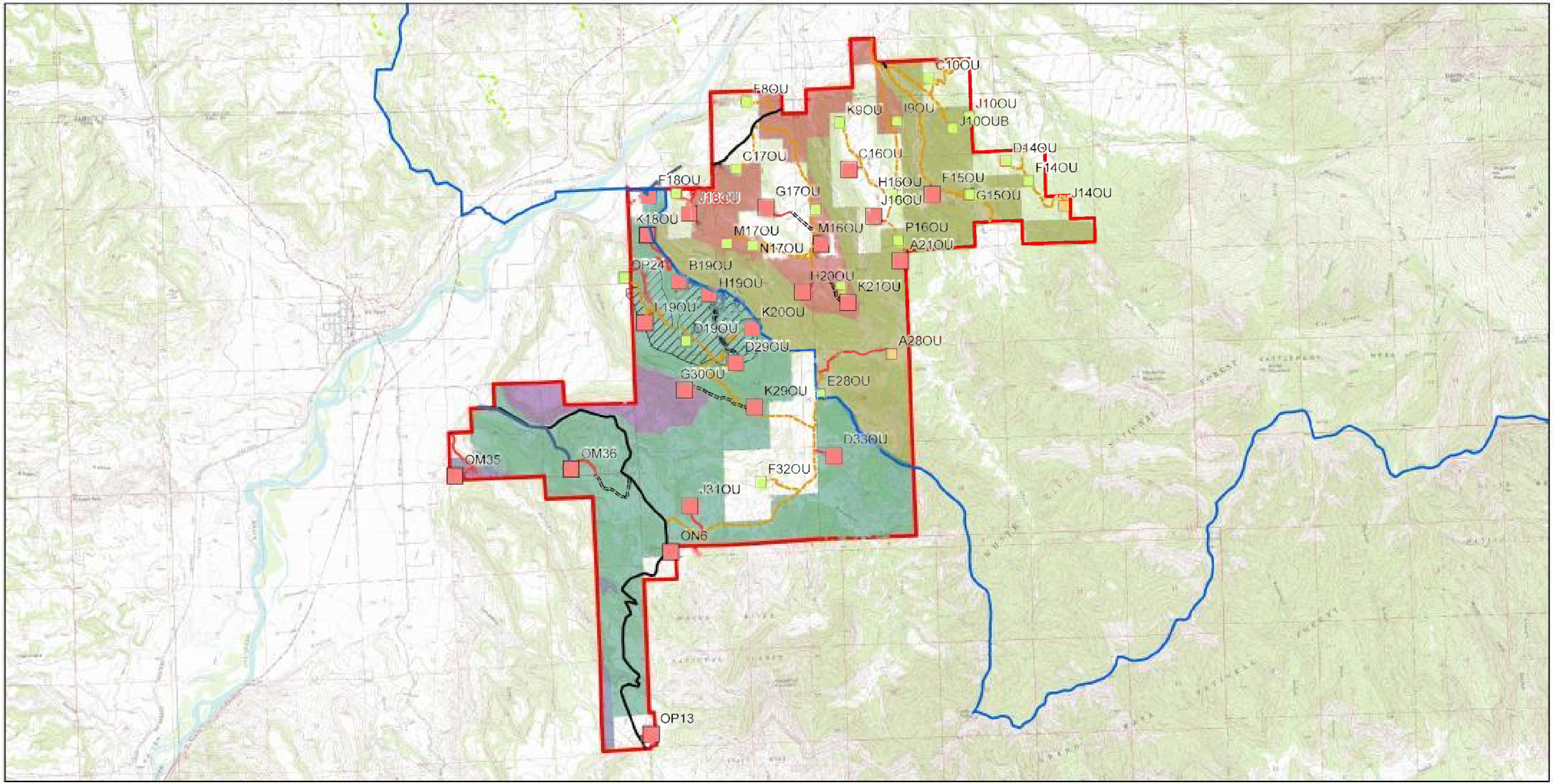
Table 15. Range Management - Loss of Forage				
Allotment Name & Number	**Short-term Disturbance (acres)**	**Long-term Disturbance (acres)**	**AUM Loss (short-term)**	**AUM Loss (long-term)**
Glenwood Springs Field Office				
Alkali Creek Common #08130	22.9	7.2	3.2	1.0
Alkali Gulch #08131	14.3	4.9	4.0	1.2
Subtotal	**37.2**	**12.1**	**7.2**	**2.2**
Grand Junction Field Office				
Sunnyside Common #06801	118.0	34.1	9.2	2.8
Baldridge Mesa #06851	6.0	1.7	0.3	0.1
Lyons/Anderson #16811	21.1	6.0	1.3	0.3
Subtotal	**145.1**	**41.8**	**10.8**	**3.2**
GRAND TOTAL	**182.3**	**53.9**	**18.0**	**5.4**
Short-term and long-term disturbance acreages were calculated based on Table 1 and location of pads within range management allotments. AUM loss for GJFO was based on 25 acres/AUM for juniper habitat and 10 acres/AUM for sagebrush habitat.				

In addition to the loss of forage, an increase in human activity related to development and maintenance of the developments would cause cattle to avoid certain areas of the allotments. However, livestock may also benefit from improved access. New roads and pipelines would open access to areas of the allotments that are difficult for livestock to reach because of thick brush and/or steep slopes. Improvement in livestock distribution would improve forage utilization throughout the allotment.

The increase in human activity and traffic on roads associated with oil and gas development can be negative to certain grazing practices such as with sheep. For example, one consequence of the Orchard Unit GAP permitted in 2005, is that the Alkali Gulch grazing allotment for sheep is no longer being used. The combination of a loss in forage, increase in traffic, and costs associated with sheep herders make sheep grazing economically impracticable for permittee. Further development of the OMDP project area would like continue to negatively affect sheep grazing in the area.

It is not anticipated that the impacts from implementation of the proposed action would require adjustment of the livestock stocking rate. The level of forage utilization will be monitored on the allotment and if necessary, adjustments in livestock use will be made to protect land health. Appendix D (GJFO No. 20 and GSEO No. 12) presents standard conditions of approval related to range management resources.

Several range improvement projects have been implemented within the GJFO OMDP project area, including the construction of five stock ponds, two water catchment systems, and a fuels reduction treatment aimed not only reducing fuels but also increasing palatable forage for livestock and wildlife. The proposed action would not directly affect any water improvement projects within the OMDP project area. However a site-specific condition of approval for pad D29OU would ensure that no indirect impacts would occur to Lucus Mesa Catchment System #2 (Appendix F).



Legend

Grand Junction Range Allotments
- Baldridge Mesa
- Lyons/Anderson
- Sunnyside Common

Glenwood Springs Range Allotments
- Alkali Creek Common
- Alkali Gulch

Range Improvements
- Sandwash North Area Fuels

- OMDP Boundary
- GJFO GSFO Boundary
- Approved Well Pad
- Existing Well Pad
- Proposed Well Pad

- Existing Road
- Road Needing Improvement
- New Road
- County Road
- Proposed Pipeline

1 inch equals 5,333 feet
Scale: 1:64,000
Countour Interval: 40 ft
Date: September 2008

Figure 5: Range Management Allotments & Fuel Treatment Areas.

BASE: U.S.G.S. 7.5 Minute
DeBeque, Grand Valley, Housetop Mountain, and Red Pinnacle, Colorado Quadrangles

Note: Well Pads Not to Scale

Note: Areas outside of Range Allotments are private lands.

N
W E
S

0 1 2 Miles

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The proposed action would directly affect the Sand Wash Fuels Reduction Treatment area completed in 2004 on Lucus Mesa. Based on the acreages in Table 1, the five proposed pads (B19, H19, L19, K20, and D29) and a portion of a road for K18 located on Lucus Mesa would result in a total short-term disturbance of 44.6 acres and a long-term disturbance of 15.1 acres. To mitigate these losses, EnCana would implement another Fuels Reduction Treatment in the general area, which has already been analyzed in a previous EA (BLM 2003).

No Action Alternative

No significant impacts to range management resources would occur under the No Action Alternative.

Realty Authorizations

Affected Environment

No existing right-of-way (ROW) authorizations exist within the GSEO portion of the project area. Within the GSFO portion of the OMDP there are no new authorizations which would be required by the proposed action. Within the GJFO portion of the project area the surface and mineral estates of the subject lands are owned by the United States of America (non-Federal lands in the OMDP proposal are not covered in this section). Existing uses shown on the Master Title and Oil and Gas Plats are identified below in Table 16. As of September 26, 2005 there were no active mining claims and no filing for claims has occurred since then. Potential impacts to the existing ROWs would be mitigated based on agreement between EnCana and existing ROW holders.

Table 16: GJFO Existing Realty Authorizations.

Oil and Gas Leases	Powerlines	Access Roads	Reservoir	BLM Easement	Right-of-Way
COC012426 COC13192 COC38012 COC58675 COC58676 COC58678 COC58681 COC61710 COC64191 COC64812 COC64816 COC64812	COC030996 COC40195 COC29423	COC62972 COC67655 COC69632 COC67450	COC4437	COC16406 COC12131	COC0125217 COC68687 COC65900

Environmental Consequences

Proposed Action

Standard reclamation measures (Appendix D GJFO No. 18) would be required for these ROW authorizations. EnCana would be required to obtain any necessary ROWs for pipelines and proposed access roads. EnCana would also be responsible for obtaining an oil and gas drilling lease, which they would be responsible for renewing upon expiration. The operator shall obtain agreements allowing construction with all existing rights-of-way holders, authorized users and pipeline operators, prior to surface disturbance or construction of the location or access across or adjacent to any existing or approved rights-of-way or pipelines (Appendix D GJFO No. 4). No BLM ROWs are needed for this project

because Federal regulations support permitting roads and pipelines via APDs when they are located within the boundaries of a lease or unit.

No Action Alternative

No new ROW authorizations would be necessary on either the GJFO or GSFO portions of the project area.

Recreation

Affected Environment

The project area is located on a combination of private property and public lands. Approximately 9,454 acres are administered by the BLM, 25 acres are under the jurisdiction of the Bureau of Reclamation, 56 acres are under the jurisdiction of the U.S. Forest Service, 1760 acres are split estate (i.e. private surface with Federal mineral subsurface ownership),and 772 acres are private land with private mineral rights.

The OMDP project area lies within the Colorado Division of Wildlife (CDOW) Game Management Unit No. 42 (GMU 42) (CDOW 2008). The GMU 42 is located primarily in Garfield County, and also extends south into Mesa County. The GMU is bounded on the north by the Colorado River and on the south by the White River National Forest, by the Colorado River on the west and by the Divide Creek drainage on the east. The primary recreational uses of the adjacent USFS and BLM lands within the OMDP vicinity is seasonal hunting. Hunting is managed and licensed by the CDOW and includes archery and/or rifle season for deer, elk and bear at various times between August 30 and November 16. Turkey hunting seasons occur from mid-April through May and from September 1 to October 5. Limited mountain lion hunting licenses are issued from approximately mid-November to March 31 of each year.

Overall recreational use of the project area by the public is low due to the steep, rugged terrain and the lack of improved roads and recreational facilities. Some hunting and other disperse recreation such as off-road vehicle uses does occur. The White River National Forest boundary is adjacent to the project area along portions of the east and south project limits, and provides indirect access to the project sites. However, the steep terrain and lack of established roads or trails limits the degree of public use.

No developed recreational facilities such as campgrounds, picnic areas, or improved hiking/biking trails are located within the project area. Overall, the BLM-administered portion of the OMDP area features minimal evidence of visitor management and site modifications, which adds to its primitive character.

The portion of the White River National Forest adjacent to the OMDP does not include developed recreational resources, although informal camping and recreational uses are generally allowed. There are four outfitters that are active within the OMDP project area, although the OMDP area comprises a small portion of their total use area.

Environmental Consequences

Proposed Action

The proposed action would result in increased vehicle traffic, noise, dust and human activity during construction, and continuing to a more limited degree, throughout the operational life of the project. Construction and well-drilling activities would likely displace game species in localized areas within close proximity to these activities, and both hunters and game would be displaced to other locations within and outside of the project area.

The project area is located within the Semi-Primitive Motorized (SPM) recreation opportunity class as designated through the BLM Recreation Opportunity Spectrum (ROS) classification system for recreational lands. The SPM recreation opportunity class is characterized as predominately unmodified natural environment of moderate to large size that provides (1) some opportunity for isolation from the sights and sounds of man, (2) an opportunity to have a high degree of interaction with the natural environment, (3) an opportunity for moderate challenge and risk and the ability to use outdoor skills, and (4) an explicit opportunity to use motorized equipment.

Over the 20- to 30-year operating life of the project, the presence of natural gas wells, production equipment, and other facilities would alter the recreational character of the project area from generally natural to relatively developed. The recreation setting of the project area can be expected to change from Semi-Primitive Motorized (SPM) to Roaded-Natural (RN). The greatest impacts would be felt by visitor seeking solitude or recreational opportunities in a relatively remote, rural, pristine landscape. The presence of oil and gas facilities and roads, increased traffic and increased human activity in the analysis area would affect the overall quality of the visitor experience.

Changes in the physical and social recreation setting would impact the recreational experience of traditional users, especially big game hunters, due to displacement of big game animals. Hunters may be replaced by recreational users seeking different activity opportunities and experiences.

The proposed action is unlikely to generate a substantial increase in public recreational use even with the increased motorized access to and through the project area. Use of the area is limited by relatively little public road access, and the access roads created or used by EnCana would be signed and/or gated at private property boundaries.

Based on the level of impacts, no mitigation is necessary.

No Action Alternative

Due to the relatively small-scale of development, the displacement of big game is not likely to be widespread, and big game hunters would not be substantially affected. The development of multiple wells from one pad is not likely to result in a change in the recreational character of the area. Under this alternative, the area would likely retain its Semi-Primitive Motorized (SPM) recreational class designation.

Socio-Economics

Affected Environment

The OMDP area is located within Garfield and Mesa counties, Colorado. In the year 2000 the population of Garfield County was 44,300. Through the year 2005 the population had grown by approximately 2.7 percent per year, resulting in 51,000 residents in 2005 (Colorado State Demography Office, May 2006). Garfield County population is expected to continue to grow rapidly, reaching an estimated population of 63,300 by 2010 and 146,300 by the year 2035.

In the year 2000, the population of Mesa County was 117,700. Through the year 2005 the population had grown by approximately 2.2% per year, resulting in 130,400 residents (Colorado State Demography Office, May 2006). The population of Mesa County is expected to reach 144,700 by 2010 and 246,152 by the year 2035.

In the year 2005, industry groups in Garfield County with the highest percentage of total employment were government, including education, health and social services (25.9%), construction (15.0%), retail trade (13.6%), and arts, entertainment, recreation, arts, accommodations and food service (12.8%) (Garfield County Socio-Economic Impact Study – Final Report January 17, 2007). An estimated 29% of the population was not in the labor force in the year 2000 and did not earn wages.

Employment in agriculture and mining accounted for 7.4% of total employment. In the year 2005, an estimated 3,395 persons were employed within the mining industry in Garfield County. Total employment in Garfield County was approximately 30,000 jobs in 2005, and is expected to increase up to 60,000 by the year 2025 (Colorado State Demography Office 2007).

In the year 2005, industry groups in Mesa County with the highest percentage of total employment were government including education, health and social services (20.7%), construction (10.4%), retail trade (13.4%), education, health and social services (12.2%), and arts, entertainment, recreation, accommodations and food service (9.7%) (U.S. Bureau of Census 2000). An estimated 36% of the population was not in the labor force in the year 2000. Employment in agriculture and mining accounted for 3% of total employment. In the year 2005, an estimated 3,920 persons were employed within the mining industry in Mesa County. Total employment in Mesa County was approximately 34,400 jobs in 2005, and is expected to increase to 55,200 by the year 2025 (Colorado State Demography Office 2007).

In the year 2006, oil and gas assessed valuation in Garfield County amounted to $1,745,277,070 or about 65% of total assessed value in the county (Garfield County 2007). Based on this assessed value, the top five taxpayers in the county in 2006 were mining companies. Total tax revenues from property taxes and special district levies were $117,971,396.

In the year 2006, oil and gas assessed valuation in Mesa County amounted to $60,780,420 or about 68% of total assessed value in the county (Mesa County 2007). Based on this assessed value, at least one and as many as five of the top five taxpayers in the county in 2006 were mining companies. Total tax revenues from property taxes and special district levies were $94,151,122 in 2006.

The Federal government also makes “Payment in Lieu of Taxes” (PILT) to county governments to offset a portion of property tax revenue lost from nontaxable Federal lands within county boundaries. Payments are based on Federal acreage in the county for all Federal land agencies including the BLM, U.S. Forest Service (USFS), U.S. Fish and Wildlife Service (USFWS) and the National Park Service (NPS). PILT revenues received in 2001 by Garfield County were $1,097,302, and by Mesa County were $1,347,658 (USDI 2008).

In addition to PILT payments, Federal mineral royalties are levied on oil and gas production from Federal mineral leases. For oil and gas production in Garfield County in 2007, total Federal royalties collected amounted to $543,750. Royalty payments are distributed to counties, towns, and school districts. In 2007, the Mesa County share of Federal mineral lease royalties was also $543,750 (Colorado Department of the Treasury 2008).

The NEPA process requires a review of the environmental justice issues as established by Executive Order 12898 (February 11, 1994). The order established that each Federal agency identify any “disproportionately high and adverse human health or environmental effects of its programs, policies and activities on minority and low-income populations.” The Hispanic community is the only minority population of note in the vicinity of the OMDP area. In 2000, 16.7% of the residents of Garfield County and 10.0% of the residents of Mesa County identified themselves as Hispanic or Latino. This percentage is representative of the state of Colorado (17.1%). African Americans, American Indians, and Pacific

Islanders account for less than 1% of the Garfield County population, which is below the state levels (U.S. Census Bureau 2000).

Environmental Consequences

Proposed Action

The proposed action would increase the number of jobs for people directly employed in the oil and gas industry and indirectly contribute to the number of jobs in the goods and services industries that support the oil and gas industry. These jobs would have minor, long-term beneficial effects on local communities such as Rifle, Silt, Parachute, Battlements Mesa, DeBeque, and Grand Junction.

Local governments in Garfield and Mesa Counties would experience a small but beneficial impact from increases in PILT payments, resource royalties, and property tax revenues.

Housing availability is insufficient in most of the affordable local communities within Garfield and Mesa counties, and the proposed action would be expected to make a minor contribution to reducing the availability of affordable housing. However, the relatively high-paying wages of oil and gas jobs could allow some workers to obtain higher cost housing without substantially reducing their living or housing standards.

The proposed action could contribute both positively and negatively to the Hispanic and other low-income population segments in the socioeconomic analysis area. The jobs in the goods and services sector would grow to a small extent; however, there would also be minor reductions in available affordable housing. The proposed action would likely have some positive, indirect contribution to the availability of public services through PILT, royalty and property tax revenues.

Economic loss to private land owners may result from the potential displacement of big game and resulting reduction in private big game hunting within the project area. The overall impact is expected to be minor due to the low level of commercial hunting in the area.

Based on the level of impacts no mitigation is necessary.

No Action Alternative

Due to the small scale of development that would occur under this alternative, there would be a small number of additional job opportunities. There would be few impacts to the supply of affordable housing. Local governments would receive a minor benefit from Federal mineral royalties because the development would occur on private mineral estate from a BLM surface location.

Recreational impacts to adjacent landowners would be minimal because the displacement of big game would not be widespread. This alternative would cause only nominal change in the recreational and visual character of the area.

Soils (includes an analysis of Public Land Health Standard 1)

Affected Environment

Soils of the OMDP project area have been mapped in two different soil surveys. The *Soil Survey of Rifle Area, Colorado, Parts of Garfield and Mesa Counties* (USDA-SCS 1985) covers the northeastern 14% of the project area and the *Soil Survey of the Douglas-Plateau Area, Colorado, Parts of Garfield and Mesa*

Counties (USDA-SCS 2003) covers the remaining 86% of the project area. Table 17 summarizes the different soil types present within the project area. Figure 6 is a soil map of the OMDP area.

Table 17. Soil Types in the OMDP Area.

Soil Association Name, Map Unit, Project Area%	Soil Description	Slope	Hazard of Erosion
Rifle Area Soil Survey – 14.2% of Area			
Arvada Loam #4 <0.1%	Deep, well-drained, sloping soil on fans and high terraces. Formed in highly saline alluvium derived from sandstone and shale. Surface runoff is moderately rapid.	6-20%	Moderate to Severe
Ildefonso Stony Loam #33 <0.1%	Moderately-sloping to hilly, deep, well-drained stony loam formed from reworked alluvium derived from basalt. Found on mesas, benches, and the sides of valleys. Surface runoff is moderate.	6-25%	Moderate to Severe
Ildefonso Stony Loam #34 5.6%	Hilly, deep, well-drained stony loam formed from reworked alluvium derived from basalt. Found on mesa breaks, alluvial fans and the sides of valleys. Surface runoff is moderate.	25-45%	Moderate to Severe
Nihill Channery Loam #46 1.4%	Deep, well drained, nearly level to gently sloping soil on alluvial fans sides of valleys. Formed in alluvium derived from Green River shale and sandstone. Surface runoff is slow.	1-6%	Slight
Potts Loam #55 <0.1%	Moderately-sloping, deep, well-drained loam and clay loam formed from in alluvium derived from sandstone, shale, and basalt. Found on mesas, benches, and the sides of valleys. Surface runoff is slow.	3-6%	Slight to Moderate
Potts Loam #56 <0.1%	Deep, well-drained moderately sloping to rolling loam and clay loam formed from in alluvium derived from sandstone, shale, and basalt. Found on mesas, benches, and the sides of valleys. Surface runoff is moderate.	6-12%	Slight to Severe
Potts-Ildefonso Complex #57 <0.1%	Gently-sloping to rolling, deep, well-drained loam and clay loam formed from in alluvium derived from sandstone, shale, and basalt. Found on mesas and the sides of valleys. Surface runoff is slow.	3-12%	Slight to Moderate
Potts-Ildefonso Complex #58 <0.1%	Strongly-sloping to hilly, deep, well-drained loam and clay loam formed from in alluvium derived from sandstone, shale, and basalt. Found on mesas and the sides of valleys. Surface runoff is moderate.	12-25%	Moderate to Severe
Potts-Ildefonso Complex #59 1.5%	Hilly to very steep, deep, well-drained loam and clay loam formed from in alluvium derived from sandstone, shale, and basalt. Found on alluvial fans and the sides of valleys. Surface runoff is moderate.	25-45%	Moderate to Severe
Torriorthents-Camborthids-Rock Outcrop Complex, steep #66 <0.1%	Exposed sandstone and shale bedrock, loose stones, and shallow to deep stony loams and clay found on toeslopes and concave open areas on foothills and mountainsides. Runoff is very rapid.	15-70%	Severe to Very Severe

Table 17. Soil Types in the OMDP Area.			
Soil Association Name, Map Unit, Project Area%	**Soil Description**	**Slope**	**Hazard of Erosion**
Torriorthents-Rock Outcrop Complex, steep #67 1.8%	Exposed sandstone and shale bedrock, loose stones, and shallow to deep stony and very channery loams exposed on south-facing slopes of mountains, hills, ridges, and canyonsides. Runoff is very rapid.	15-90%	Severe to Very Severe
Wann Sandy Loam #72 <0.1%	Deep, somewhat poorly drained, nearly level to gently sloping, low-lying soil on terraces and bottomlands in valleys. Formed in alluvium derived from sandstone and shale. Surface runoff is slow.	1-3%	Slight
Douglas Plateau Area – 85.8% of Area			
Badland #2 7.0%	Vary shallow, poorly-drained areas showing no soil characteristics; formed from residuum derived from highly calcareous and gypsiferous shale and bentonite. Surface runoff is rated as very rapid.	10-65%	Severe
Barx Loam #3 7.0%	Deep, well-drained loam and clay loam formed in eolian deposits derived from mixed materials and found between 5,000 and 6,400 feet. Surface runoff is rated as moderate.	3-12%	Moderate
Barx-Clapper Complex #4 7.2%	Deep, well-drained loam and very stony loam formed in eolian deposits derived from mixed materials and found on dissected plateaus. Surface runoff is rated as moderate and erosion potential is severe.	3-12%	Slight to Moderate
Bunkwater Very Fine Sandy Loam #12 4.3%	Deep, well-drained sandy loam and clay loam formed in eolian deposits derived from mixed materials and found on structural benches. Surface runoff is rated as slow.	1-8%	Slight to Moderate
Clapper Very Stony Loam #22 11.8%	Deep, well-drained very stony loam and very cobbly loam formed in weathered glacial till derived from basalt and mixed materials; found on the side slopes of mountains. Surface runoff is rated as rapid.	12-25%	Moderate to Severe
Clapper very stony loam #23 16.6%	Deep, well-drained very stony loam and very cobbly loam formed in weathered glacial till derived from basalt and mixed materials; found on foothill slopes. Surface runoff is rated as rapid.	25-65%	Severe
Dominguez Clay Loam #32 4.6%	Deep, well-drained clay loam formed from sandstone and shale residuum and clay found on alluvial fans and toeslopes. Surface runoff is rated as moderate.	3-8%	Slight to Moderate
Happle Very Channery Sandy Loam #44 <0.1%	Deep, well-drained very channery sandy loam and very channery sandy clay loam formed in alluvium derived from shale residuum found on alluvial fans. Surface runoff is rated as slow.	3-12%	Slight to Moderate
Rock Outcrop-Torriorthents-Complex #61 2.9%	Exposed sandstone and shale bedrock, loose stones, and shallow to deep stony loams exposed on south-facing slopes of mountains, hills, ridges, and canyonsides. Runoff is very rapid.	15-90%	Severe to Very severe

Table 17. Soil Types in the OMDP Area.			
Soil Association Name, Map Unit, Project Area%	**Soil Description**	**Slope**	**Hazard of Erosion**
Torriorthents-cool-Rock Outcrop Complex #65 <0.1%	Exposed sandstone and shale bedrock, loose stones, and shallow to deep stony and very channery loams exposed on south-facing slopes of mountains, hills, ridges, and canyonsides. Runoff is very rapid.	35-90%	Severe to Very severe
Torriorthents-warm-Rock Outcrop Complex #66 13.8%	Exposed sandstone and shale bedrock, loose stones, and shallow to deep stony and very channery loams exposed on south-facing slopes of mountains, hills, ridges, and canyonsides. Runoff is very rapid.	35-90%	Severe to Very severe
Travessilla-Rock Outcrop Complex #69 8.7%	Travessilla soils make up 45% of this unit and are found on mesas. The parent material is residuum weathered from sandstone. The soils are well-drained.	10-35%	Moderate to Severe
Uffens Loam #70 <0.1%	Gently sloping soils on terraces and mesas derived from mixed material alluvium. Well drained soils.	1-8%	Slight to Moderate
Youngston Loam #78 <0.1%	Gently sloping soils on floodplains, terraces, valley floors, and alluvial fans derived from calcareous, stratified alluvium of sedimentary rocks. Well drained soils.	1-6%	Slight to Moderate
Hazard of Erosion = from off-road to on-road from Survey Area Database Version 3 available online at http://websoilsurvey.nrcs.usda.gov/app/.			

Twelve different soil map units occur in the northeast 14% of the OMDP project area (USDA-SCS 1985). The Ildefonso stony loam 25-45% slopes (Map Unit #34) is the most common soil type in this area and has a moderate to severe hazard of erosion; however, the Nihill channery loam, the Potts-Ildefonso complex, and the Torriorthents-Camborthids-Rock outcrop complex are also present to some degree. Fourteen different soil types have been mapped within the remaining 86% of the OMDP project area (USDA-SCS 2003). Approximately 50% of these soils have severe to very severe erosion hazard (Map Units 2, 23, 61, 65, 66, 69), the most common being the Badland soil type, Clapper very stony loam 25-65% slopes, and the Torriorthents-warm-Rock outcrop complex.

Soils with severe to very severe erosion hazard and occurring on slopes in excess of 30% are considered "fragile soils." Such soils generally require oil and gas operators to follow special operating constraints in order to maintain soil productivity, prevent accelerated soil erosion, and protect water quality and quantity.

In recognition of the potential erosion hazard, Federal leases COC55198, 58674, 58675, 58676, and 58678 contain a Controlled Surface Use (CSU) stipulation designed to protect fragile soils. This stipulation would require EnCana to use a series of BMPs and have other special operating constraints in areas of fragile soils on slopes of 30% or greater. Leases COC64189 and 64191, which apply to proposed pads D33OU, H20OU, and K21OU, have a CSU to protect erosive soils on slopes greater than 30% and a No Surface Occupancy (NSO) on steep slopes greater than 50%. Finally, Federal lease COC64197, which applies to pads OM35 and OM36, has a Steep Slope Stipulation that requires EnCana to have special design practices on slopes greater than 40%.

Environmental Consequences

Proposed Action:

As summarized in Table 1, implementation of the proposed action would initially disturb up to 235.6 acres of soils. The disturbance would be caused by the construction of the well pads (125.4 acres), and collocated access roads and gas gathering pipelines (110.2 acres). Most of this area would be reclaimed and revegetated upon the completion of construction. The remaining 66.6 acres would remain disturbed for the life (i.e., 20 to 30 years) of the project.

The most important potential consequence of these disturbances would be an increase in erosion and offsite sedimentation. Potential increases in erosion and sedimentation would be variable across the OMDP project area depending on the steepness of the terrain and the erosion potential of the soil. The potential would be greatest where proposed construction activities coincide with steep slopes and fragile soils (Figure 7).

In the Glenwood Springs Field Office Resource Area, only two well pads would be constructed on fragile soils: the F15OU well pad would be partially constructed on the Torriorthents- Rock Outcrop Complex, 15 to 90% slopes, with severe to very severe erosion hazard, and the J18OU well pad would be constructed on the Clapper very stony loam, 25-65% slopes with a severe erosion hazard. However, based on survey plats provided by TriState Land Surveying, the average slopes of the F15OU and J18OU well pads are under 20%, hence no special mitigation is required.

In the Grand Junction Field Office Resource Area, proposed pads and associated roads/pipelines for G30OU and the proposed road/pipeline to K18OU would impact the Clapper very stony loam, 25-65% slopes with a severe erosion hazard. However, based on survey plats provided by TriState Land Surveying, the average slopes of the G30OU well pad and road are under 20%, hence no special mitigation is required. However, a portion of the proposed road to K18OU along the northeast side of the ephemeral drainage appears to have slopes in excess of 40%. Lease COC58675 for the K18OU area contains a CSU stipulation for protection of fragile soils. Therefore, as part of the site-specific COA for K18OU, EnCana would submit and implement a plan of development that demonstrates that the performance objectives and standards for fragile soils will be met (Appendix F).

Other potential impacts to fragile soils within the GJFO include a portion of pad ON6 which overlies the Travessilla-Rock Outcrop Complex (Map Unit #69) which has moderate to severe erosion hazard, however the pad would be constructed on slopes less than 20% and hence no special mitigation is necessary.

The soils of pad OM36 and portions of its collocated road/pipeline would impact the Torriorthents-warm-Rock outcrop complex (Map Unit #66) with severe to very severe erosion hazard. However, the proposed pad would be constructed on slopes less than 20% and the proposed road would be constructed on slopes less than 30% and hence no special mitigation is necessary. Finally, pad OM35 and its ancillary facilities would also impact the Torriorthents-warm-Rock outcrop complex. Although the proposed pad would not be constructed on steep slopes, a portion of the proposed road in the NW¼ of the SW¼ of Section 35 appears to traverse through slopes in excess of 40%. Per Lease COC64197, special mitigation is required when impacts occur to soils on slopes greater than 40%. As a site-specific COA for OM35, EnCana would develop and implement plans to mitigate this disturbance.

It should also be noted that nearly all well pads and roads in the OMDP are situated at least partly on soils with severe to very severe erosion hazard. Although no existing slopes in excess of 30% would be impacted and therefore the CSU for fragile soils is not triggered, care should be taken to avoid steepening

cut slopes beyond 30%. Where such steepening is unavoidable, efforts should be made to minimize erosion hazard. Applicable BMPs, as described in Appendix D, include application of geotextiles, staked straw wattles, terraces, hydroseeding, and planting of native shrubs.

In all cases, the greatest risk would occur when the most soil is exposed, especially during periods of runoff and precipitation events. This situation would exist between completion of construction activities and prior to the reestablishment of vegetation. These risks would be mitigated, in part, through the implementation standard COAs found in Appendix D (GJFO Nos. 3, 16 & 18 and GSEO Nos. 6 & 13) and those applicable site-specific COAs found in Appendix F. After successful revegetation, the erosion rate and potential sediment yield would drop to near baseline conditions but would remain at slightly elevated levels due to the presence of new access roads.

No Action Alternative

The No Action Alternative would include the development of one well pad, A28OU, and its associated access road/pipeline, which do occur on fragile soils. However, the slopes are less than 30% and hence any impacts would be minor.

Analysis on the Public Land Health Standard for Upland Soils. According to the Battlement Mesa Area Land Health Assessment (USDI 2000), upland soils currently meet Standard 1 within the OMDP project area. With timely implementation of the requirements of lease stipulations and mitigation measures found in the site-specific COAs, the implementation of applicable conditions of approval, and timely interim reclamation of disturbed areas, the proposed action would not likely prevent Standard 1 from being met.

Vegetation (includes an analysis of Public Land Health Standard 3)

Affected Environment

The primary vegetation types in the OMDP project area are juniper woodlands and sagebrush shrublands (Table 18). Not only are these two communities found in relatively pure stands, but they also intergrade with other plant communities to form complex mosaics across the landscape. In addition, the OMDP project area is characterized by shadscale *(Atriplex confertifolia)* saltbush communities, greasewood shrublands, disturbed rangelands, and wetland and riparian habitats (see **Wetlands and Riparian Zones**).

Vegetation communities within the study area were identified during onsite field visits in the fall of 2006 and spring of 2007 and mapped using data from the Colorado Vegetation Classification Project (CDOW 2003). This project, a cooperatively funded project between the BLM, CDOW, and the USFS, incorporates remote sensing data acquired from Landsat TM imagery and computer modeling to map land cover within southwest Colorado. However, as land cover from satellite imagery is not always completely accurate, minor adjustments were made based on field observations.

Figure 8 is a vegetation map of the OMDP project area. Table 18 shows the areal extent of each cover type within the project area. Vegetation types are described following the figures and table.

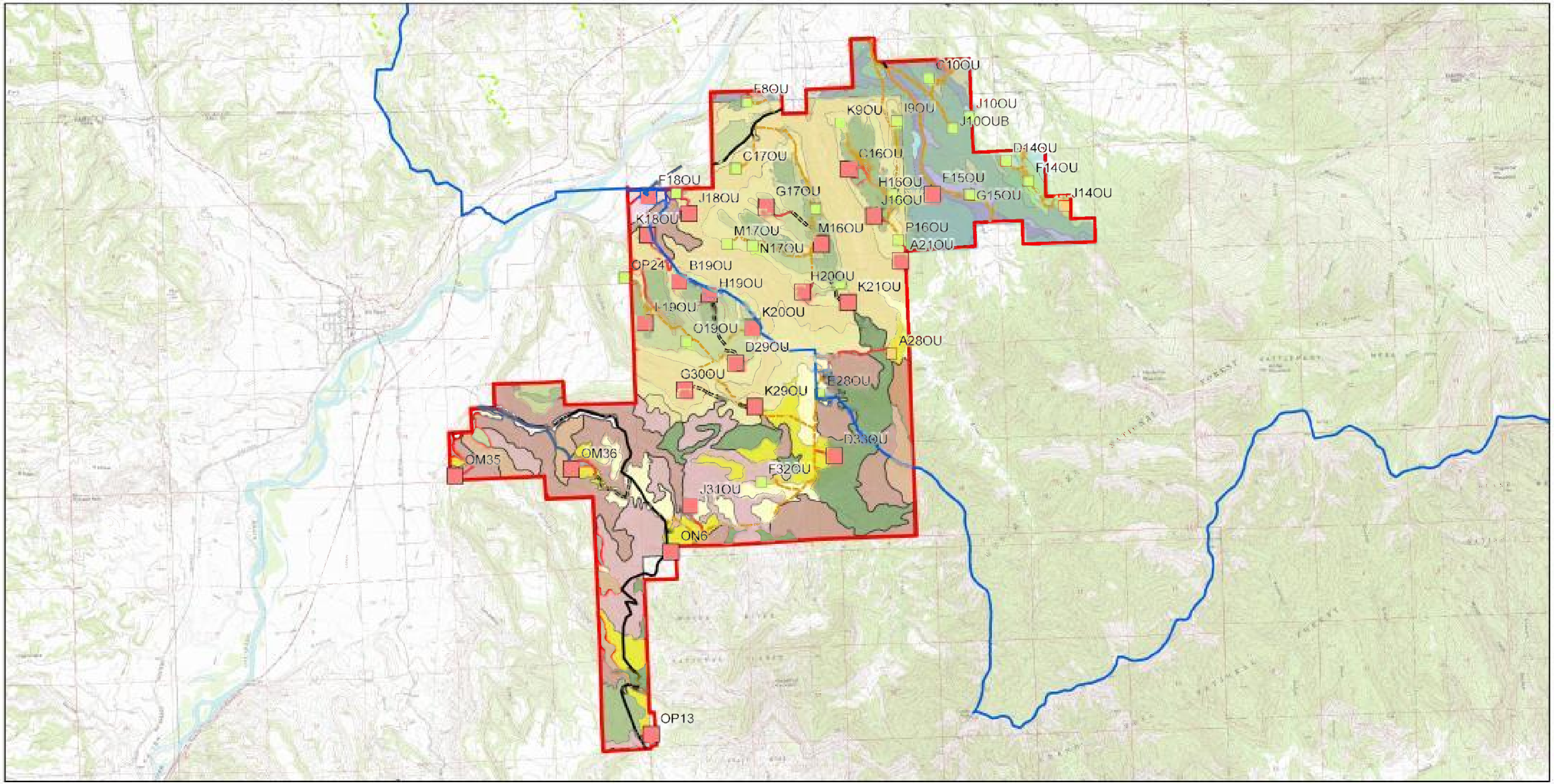


Figure 6: Soil Types

Legend

Douglas Plateau Area
- 2 Badland
- 3 Barx Loam
- 4 Barx-Clapper complex
- 12 Bunkwater very fine sandy loam
- 22 Clapper very stony loam 12-25%
- 23 Clapper very stony loam 25-65%
- 32 Dominguez clay loam
- 44 Happle very channery sandy loam
- 61 Rock outcrop -Torriorthents complex
- 65 Torriorthents, cool-Rock outcrop
- 66 Torriorthents, warm-Rock outcrop
- 69 Travessilla-Rock Outcrop Complex
- 70 Uffens Loam
- 78 Youngston Loam

Rifle Area Soil Survey
- 4 Arvada Loam
- 33 Ildefonso stony loam 6-25%
- 34 Ildefonso stony loam 25-45%
- 46 Nihill channery loam
- 55 Potts loam 3-6%
- 56 Potts loam 6-12%
- 57 Potts-Ildefonso complex 3-12%
- 58 Potts-Ildefonso complex 12-25%
- 59 Potts-Ildefonso complex 25-45%
- 66 Torriorthents-Camborthids-Rock outcrop
- 67 Torriorthents-Rock outcrop
- 72 Wann sandy loam

- OMDP Boundary
- GJFO GSFO Boundary
- Approved Well Pad
- Existing Well Pad
- Proposed Well Pad
- Existing Road
- Road Needing Improvement
- New Road
- County Road
- Proposed Pipeline

Note: Well Pads Not to Scale

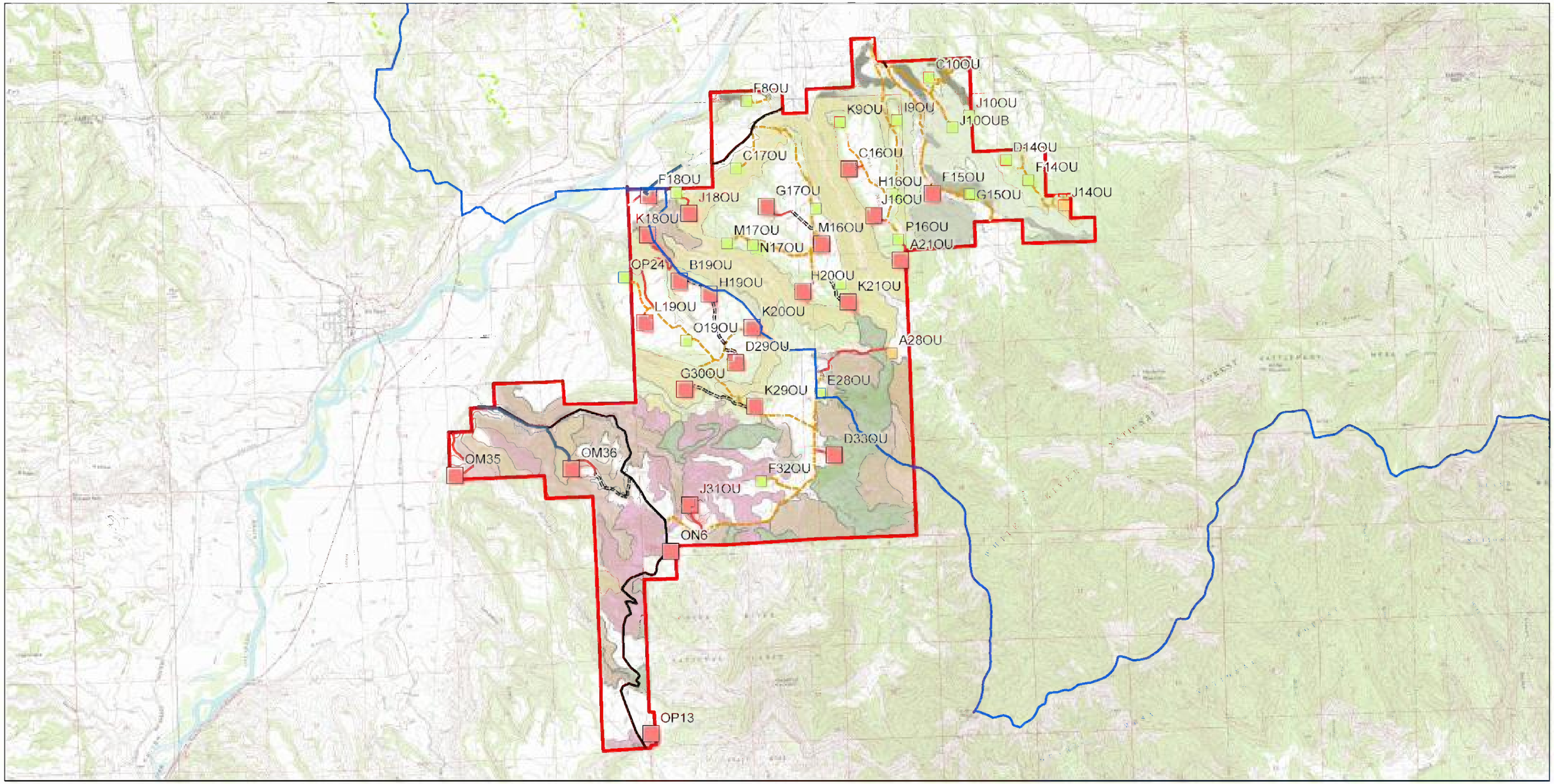
BASE: U.S.G.S. 7.5 Minute
DeBeque, Grand Valley, Housetop Mountain, and Red Pinnacle, Colorado Quadrangles

1 inch equals 5,333 feet
Scale: 1:64,000
Countour Interval: 40 ft
Date: September 2008

N W E S

0 1 2 Miles

prepared by:
Western Ecological Resource, Inc.
711 Walnut Street
Boulder, CO 80302
(303) 449-9009 FAX (303) 449-9038



Legend

Douglas Plateau Fragile Soils
- 2 Badland, 10-65%
- 23 Clapper very stony loam 25-65%
- 61 Rock outcrop -Torriorthents complex 15-90%
- 65 Torriorthents, cool-Rock outcrop complex 35-90%
- 66 Torriorthents, warm-Rock outcrop complex 35-90%
- 69 Travessilla-Rock outcrop complex, 10-35%

Rifle Area Fragile Soils
- 34 Ildefonso stony loam 25-45%
- 59 Potts-Ildefonso complex 25-45%
- 66 Torriorthents-Camborthids-Rock outcrop 15-70%
- 67 Torriorthents-Rock outcrop 15-90%
- OMDP Boundary
- GJFO GSFO Boundary

- Approved Well Pad
- Existing Well Pad
- Proposed Well Pad
- Existing Road
- Road Needing Improvement
- New Road
- County Road
- Proposed Pipeline

Figure 7: Fragile Soils

BASE: U.S.G.S. 7.5 Minute
DeBeque, Grand Valley, Housetop Mountain, and Red Pinnacle, Colorado Quadrangles
Note: Well Pads Not to Scale

1 inch equals 5,333 feet
Scale: 1:64,000
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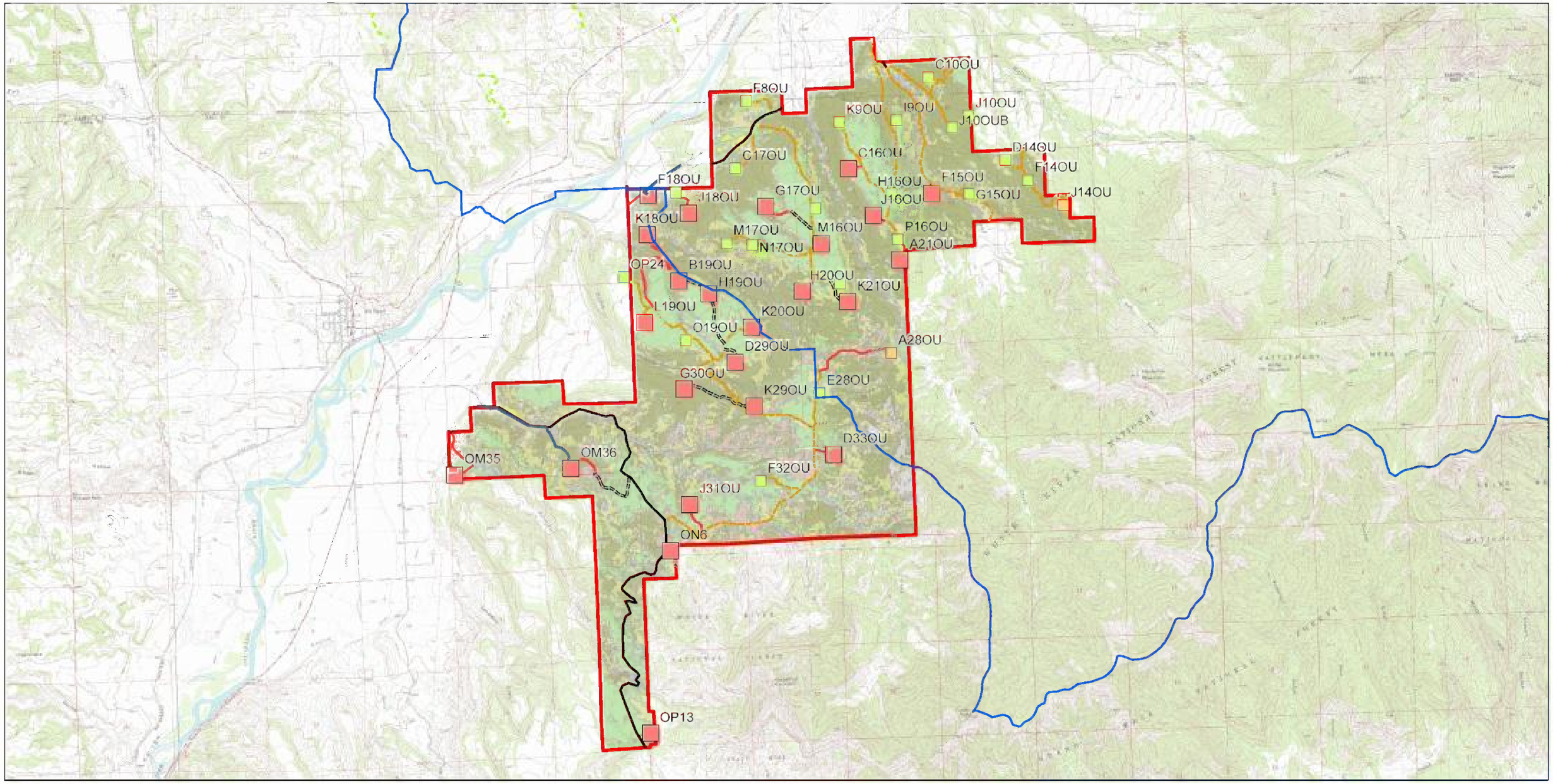

Legend

Vegetation Types
- Juniper
- Pinyon-Juniper (PJ)
- Juniper/Sagebrush Mix
- PJ-Sagebrush Mix
- PJ-Mtn Shrub Mix
- Sparse Juniper/Shrub/Rock Mix
- Sparse PJ/Shrub/Rock Mix
- Sagebrush Community
- Greasewood
- Saltbush/Shadscale Community
- Disturbed Rangeland
- Cottonwood Riparain
- Conifer Riparian
- Shrub Riparian
- Exotic Riparian Shrubs
- Herbaceous Riparian
- Rock Outcrops

- OMDP Boundary
- GJFO GSFO Boundary
- Approved Well Pad
- Existing Well Pad
- Proposed Well Pad
- Existing Road
- Road Needing Improvement
- New Road
- County Road
- Proposed Pipeline

Vegetation Types from the Colorado Vegetation Project (CDOW, 2003)

Figure 8: Vegetation Types

BASE: U.S.G.S. 7.5 Minute
DeBeque, Grand Valley, Housetop Mountain, and Red Pinnacle, Colorado Quadrangles
Note: Well Pads Not to Scale

1 inch equals 5,333 feet
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Table 18. Vegetation Types of the OMDP Area.		
	Area (Acres)	**Percent**
Coniferous Woodlands		
Juniper	3,922.57	32.5%
Pinyon-Juniper	447.95	3.7%
Subtotal	**4,370.52**	**36.2%**
Mixed Woodlands		
Juniper/Sagebrush Mix	2,080.57	17.2%
PJ-Sagebrush Mix	854.15	7.1%
Sparse Juniper/Shrub/Rock Mix	272.65	2.3%
Sparse PJ/Shrub/Rock Mix	178.46	1.5%
PJ-Mtn Shrub Mix	127.13	1.1%
Subtotal	**3,512.95**	**29.1%**
Shrublands		
Sagebrush Community	3,115.47	25.8%
Shadscale Saltbush Community	424.40	3.5%
Greasewood Flats	105.51	0.9%
Subtotal	**3,645.37**	**30.2%**
Grasslands		
Disturbed Rangeland	61.51	0.5%
Subtotal	**61.51**	**0.5%**
Riparian Areas		
Cottonwood	12.54	0.1%
Conifer Riparian	5.82	0.0%
Shrub Riparian	150.74	1.2%
Exotic Riparian Shrubs	44.21	0.4%
Sedge	2.13	0.0%
Subtotal	**215.44**	**1.8%**
Non Vegetated		
Talus Slopes & Rock Outcrops	261.22	2.2%
Subtotal	**261.22**	**2.2%**
Grand Total	**12067.00**	**100.0%**
Source: Colorado Vegetation Classification Project (CDOW 2003) and field reconnaissance.		

Juniper and Pinyon-Juniper Woodlands (including Mixed Woodlands)

Juniper woodlands and to a lesser extent pinyon-juniper (PJ) woodlands comprise approximately 36.2% of the land cover of the OMDP project area. However, an additional 29.1% of the project area consists of mixed woodlands - juniper or PJ with sagebrush shrublands, mountain shrublands, and rocky areas.

The juniper woodlands in the project area generally consist of Utah juniper (*Juniperus osteosperma*) with a variety of shrubs including snakeweed (*Gutierrezia sarothrae*), which is most common, or yucca (Yucca *harrimaniae*), spiny greasebush (*Forsellesia meionandra*) and mountain mahogany (*Cercocarpus montanus*) in rocky areas with shallow soils. Serviceberry (*Amelanchier alnifolia*), Gambel oak (*Quercus gambelii*), and skunkbrush sumac (*Rhus trilobata*), which are common components of mountain shrublands, occur sporadically within this community at higher elevations and north-facing slopes. Pinyon pine (*Pinus edulis*) also occurs with Utah juniper in the higher elevations of the project site, but is only a minor component of this woodland community.

The sparse herbaceous layer in the juniper woodland consists of graminoids such as squirrel tail *(Elymus elymoides)*, Indian ricegrass *(Achnatherum hymenoides)*, and cheatgrass, a noxious weed, as well as a variety of forbs including rock goldenrod *(Petradoria pumila)*, Fendler sandmat *(Chamaesyce fendleri)*, miner's candle *(Oreocarya* sp.*)*, twistflower *(Streptanthus cordatus)*, thrift mock goldenweed *(Stenotus armerioides)*, prince's plume *(Stanleya pinnata)*, rose heath *(Chaetopappa ericoides)*, and largeflower breadroot *(Pediomelum megalanthum)*. Cacti encountered include claret cup cactus *(Echinocereus triglochidiatus)*, prickly pear cactus *(Opuntia polyacantha*), and the occasional Simpson hedgehog cactus *(Pediocactus simpsonii)*. In extremely disturbed areas, the non-native mint, horehound occurs.

Sagebrush Shrublands

Sagebrush shrublands cover approximately 25.8% of the OMDP project area. They dominate the three large mesas in the northern portion of the OMDP project area, and occur on gentle slopes and hill tops in the southern portion of the project area. Lucus Mesa, Samson Mesa, and Creek Mesa, the three large mesas in the north, are all dominated by mixed or pure stands of mountain big sagebrush *(Artemisia tridentata var. vaseyana)* and Wyoming sagebrush *(Artemisia tridentata subsp. wyomingensis)*. Other shrubs commonly present sagebrush shrublands include snakeweed, winterfat *(Krascheninnikovia lanata)*, and some green rabbitbrush *(Chrysothamnus viscidiflorus)*. With the exception of Lucus Mesa, which was subject to a fuels reduction treatment in 2004 (see **Range Management**), most of these sagebrush shrublands on Samson and Creek Mesa are dense even-aged stands, support little understory vegetation, have a low species diversity, and have little to no regeneration.

Several of the sagebrush shrublands in the southern portion of the project area along the headwaters of Horsethief and Little Horsethief Creek, and in the north on terraces of the Colorado River, contain additional shrub species more characteristic of salt-desert shrublands, including shadscale, fourwing saltbush *(Atriplex canescens)*, spiny sagebrush *(Picrothamnus desertorum)*, spiny horsebrush *(Tetradymia spinosa)*, Parry's rabbitbrush *(Chrysothamnus parryi)*, and greasewood. However, the extent of the salt-desert shrubland community type was too small to show on the vegetation map (Figure 8).

Overall, the sagebrush shrublands support a variety of perennial native grasses, including Sandberg bluegrass *(Poa secunda)*, Indian ricegrass, galleta grass *(Hilaria jamesii)*, squirrel tail, slender wheatgrass (*Elymus trachycaulus)*, and needle-and-thread grass *(Hesperostipa comata)*. Common forbs include scarlet globemallow *(Sphaeralcea coccinea)*, rayless tansy-aster *(Machaeranthera grindelioides)*, Nuttall's sego lily *(Calochortus nuttallii)*, Nuttall's larkspur *(Delphinium nuttallianum)*, and wild buckwheat *(Eriogonum spp.).* Native herbaceous species diversity and abundance was higher on Lucus Mesa, which was subject to a fuels reduction treatment, than in other sagebrush shrublands.

All of the sagebrush shrublands appear to have been affected by non-native plant species to some degree. The most common non-natives include cheatgrass, alyssum, bur buttercup, clasping pepperweed, and redstem filaree.

Finally, basin big sagebrush shrublands *(Artemisia tridentata var. tridentata)* typically occur along floodplains and terraces of the drainages in the project site. These areas are generally dominated by basin big sagebrush with rubber rabbitbrush *(Chrysothamnus nauseosus)*, four-wing saltbush, and greasewood. Cheatgrass is the most dominant plant in the understory in these areas.

Shadscale Saltbush Community

A shadscale saltbush community occurs on many of the clay-rich adobe hill soils of the project area. These areas commonly support a codominance of shadscale and yellow milkvetch *(Astragalus flavus)*, along with western wheatgrass *(Pascopyrum smithii)*, textile onion *(Allium textile)*, purple and Fendler spring parsley *(Cymopterus purpureus, C. fendleri)*, spreading wallflower *(Erysimum repandum)*, Gordon's buckwheat *(Eriogonum gordonii)*, and the BLM-sensitive species adobe thistle. Several of these areas are also potential habitat for the Federal candidate species, DeBeque phacelia. Cheatgrass and bur buttercup also commonly occur. This vegetation type comprises 3.5% of the OMDP project area.

Greasewood Shrublands

Greasewood shrublands are concentrated on alluvial terraces near the Colorado River and scattered elsewhere along ephemeral drainages, and cover less than 1% of the OMDP project area. The understory is often dominated by non-natives such as cheatgrass, clasping pepperweed, halogeton, horehound, and tumble mustard. Native plants including galleta grass, salina wildrye *(Leymus salina)*, and claret cup cactus, are a minor component.

Disturbed Rangeland

Disturbed rangeland grassland was mapped on one-half percent of the OMDP project area. These areas have low shrub density, and are dominated by non-native weeds such as cheatgrass, clasping pepperweed, and horehound. Snakeweed, which is common in all disturbed habitats, is prevalent. There is little presence of native perennial graminoids and forbs in these areas.

Environmental Consequences

Proposed Action

Construction of the proposed pads, pipelines, and access roads would result in both direct and indirect effects to vegetation. Direct effects would include short- and long-term loss of vegetation and long-term modification of community structure and species composition. Indirect effects could include an increased potential for noxious weed invasion, increased soil erosion and sedimentation, reduced wildlife habitat quantity and/or quality, and changes in fire regime.

The proposed action would result in the short-tem loss of approximately 235.6 acres of vegetation, mainly juniper woodland and sagebrush shrublands (Table 19). Of the 235.6 acres of disturbance, approximately 66.6 acres would not be reclaimed during the life of the wells. With implementation of reclamation practices identified in Appendix D (GJFO and GSEO No. 13), establishment of desirable herbaceous vegetation on the unused portions of the pads, pipelines, and roads could be restored within 2 to 3 years. However, because of periodic workovers and the potential for additional well bores in the future, it is

likely that vegetation would remain in an early seral stage for the life of the wells. This would increase the proportion of herbaceous (i.e., non-woody) species in the areas of disturbance. Although the sagebrush shrublands would regenerate over time, this process could take up to several decades, depending on the growth and persistence of seeded species and the intensity of grazing by livestock and/or wildlife. Pinyon-juniper woodlands could take hundreds of years to return to pre-disturbance conditions.

Table 19. Acres of Disturbance by Vegetation Type.

	Acres of Disturbance (short-term)	Acres of Disturbance (long-term)
Proposed Well Pads		
Juniper	23.4	5.6
Pinyon-Juniper	7.9	2.4
Juniper/Sagebrush Mix	23.9	6.8
PJ-Sagebrush Mix	5.9	1.7
Sagebrush Community	59.7	18.0
Saltbush Community	0.0	0.0
Greasewood	4.6	1.5
Subtotal	**125.4**	**36.0**
New & Improved Roads (including pipelines)		
Juniper	32.7	8.8
Pinyon-Juniper	2.8	0.6
Juniper/Sagebrush Mix	15.4	5.2
PJ-Sagebrush Mix	7.1	2.1
Sparse Juniper/Shrub/Rock Mix	1.0	0.4
Sagebrush Community	43.1	10.4
Saltbush Community	5.8	2.2
Greasewood	1.1	0.4
Disturbed Rangeland	1.2	0.5
Subtotal	**110.2**	**30.6**
GRAND TOTAL	**235.6**	**66.6**

No Action Alternative:

Under the no action alternative, the Applications for Permit to Drill (APDs) associated with the proposed action would be denied, and none of the proposed pads, access roads, or pipelines would be developed. However, the selection of the No Action Alternative would not preclude the development of facilities that have already been approved. A substantial amount of the OMDP project area has or is currently undergoing development activities approved under the Orchard Unit Geographic Area Plan (BLM 2005a) and other NEPA documents. There are currently 22 existing well pads and 75 existing wells in the project area. An additional pad (A28OU pad) and 6 associated wells have been approved but not yet developed. Under the no action alternative, production and maintenance of the 75 existing wells will continue into the foreseeable future and the approved A28OU pad and six wells could be developed.

Under the No Action Alternative, the long-term disturbance of 43.3 acres of vegetation associated with the Orchard Unit Geographic Area Plan (BLM 2005a) would still occur; however, the 235.6 acres of short-term disturbance and 66.6 acres of long-term ground disturbance for the 24 proposed pads, and associated roads and pipelines of the OMDP would not occur.

Analysis of the Public Land Health Standard for plant and animal communities (partial, see also **Wildlife, Aquatic** and **Wildlife, Terrestrial**): The Battlement Mesa Land Health Assessment was completed by the BLM GSFO in 2000 (BLM 2000). This land health assessment roughly covers the northeast half of the OMDP project area. No land health assessment for that part of the OMDP in the GJFO has been completed. Of the thirty-five upland sites visited within the Battlement Mesa Land Health Assessment (BLM 2000), 20 sites were assessed within the OMDP project area. Twelve sites were visited within the Alkali Creek Common Grazing Allotment, of which nine were either not meeting the standard for healthy plant and animal communities or functioning at risk. Specific concerns are the poor condition of the sagebrush habitats, including low plant diversity, low cover of perennial graminoids, abundance of cheatgrass, lack of regeneration and recruitment, and juniper invasion. Four of seven sites in the Alkali Gulch Allotment and one site outside the allotment were not meeting the standard due to similar reasons: old, decadent stands of sagebrush with low diversity of understory vegetation, abundance of cheatgrass, and juniper stands with little shrub, grass, and forb diversity in the understory. Those portions of the OMDP project area within the GJFO have similar patterns of vegetation condition and many would also be found to not meet the standard. One exception is Lucus Mesa, where a sagebrush fuel reduction treatment was completed in 2004.

The proposed action would initially disturb 235.6 acres of vegetation, 66.6 acres of which would remain unvegetated for the lifetime of the project. The remaining 169.0 acres would be reclaimed to an early seral stage condition, which appears to be lacking on the project site as a whole. The proposed action also has the potential to expand noxious weed cover, such as cheatgrass. Given the poor condition of much of the OMDP project area, if the implementation of mitigation measures (Appendix D, GJFO No. 6 and GSEO No. 13) is successful, the proposed action is not likely to contribute to further degradation relative to Standard 3.

The No Action Alternative would have no bearing on the ability of the area to meet the public land health standard for plant and animal communities.

Visual Resources

Affected Environment

The proposed action would take place on both public and private lands within areas classified by the BLM as Visual Resource Management (VRM) Classes II, III, IV, and Unclassified. These classes are identified in the Glenwood Springs Resource Management Plan and amendments (USDI 1984) and by the Grand Junction Resource Management Plan (GJRMP) and Record of Decision (USDI 1987, page 2-21), as maintained and amended. The management of VRM classes, landscape character and scenic quality on private lands, public lands and split estate as well as management of visual impacts associated with well pad development and operation are discussed in the Glenwood Springs Resource Area Oil & Gas Leasing and Development Record of Decision and Resource Management Plan Amendment (GJRA Amendment, 1999), the Oil & Gas Leasing and Development FSEIS (USDI 1999b: 3-41 to 3-45, 4-49 to 4-54) and the Grand Junction Resource Area Resource Management Plan and Record of Decision (USDI 1987 page 2-21).

Additional VRM classifications and management objectives in some areas of the OMDP are dictated by stipulations appended to Federal oil and gas leases, to protect scenic and natural values along the

viewshed of a major highway (Table 3). Highway I-70 borders the Orchard MDP project area to the west, and proposed wells F18, K18, and OM35 would be affected by lease stipulations to protect scenic and natural values in a highway corridor.

Visual resource management objectives do not apply to non-BLM lands, but visual concerns may be addressed on split estate where Federal minerals or Federally connected actions occur. VRM classes shown as overlapping non-public lands act as indicators of possible visual values of those lands, which may or may not be protected, based on landowner discretion. BLM acknowledges that activities on private lands alter landscape character and affect the visual quality of the overall landscape. These modifications to overall character may be considered when evaluating mitigation proposals affecting Federal actions, such as the OMDP. The management of VRM classes, landscape character and scenic quality are discussed in the Glenwood Springs Resource Area Oil & Gas Leasing and Development Record of Decision and Resource Management Plan Amendment (GJRA Amendment, 1999), the Oil & Gas Leasing and Development FSEIS (USDI 1999b: 3-41 to 3-45, 4-49 to 4-54) and the Grand Junction Resource Area Resource Management Plan and Record of Decision (USDI 1987, page 2-21). Discussion of visual impacts associated with well pad development and operations on private lands, public lands and split estate may also be found there.

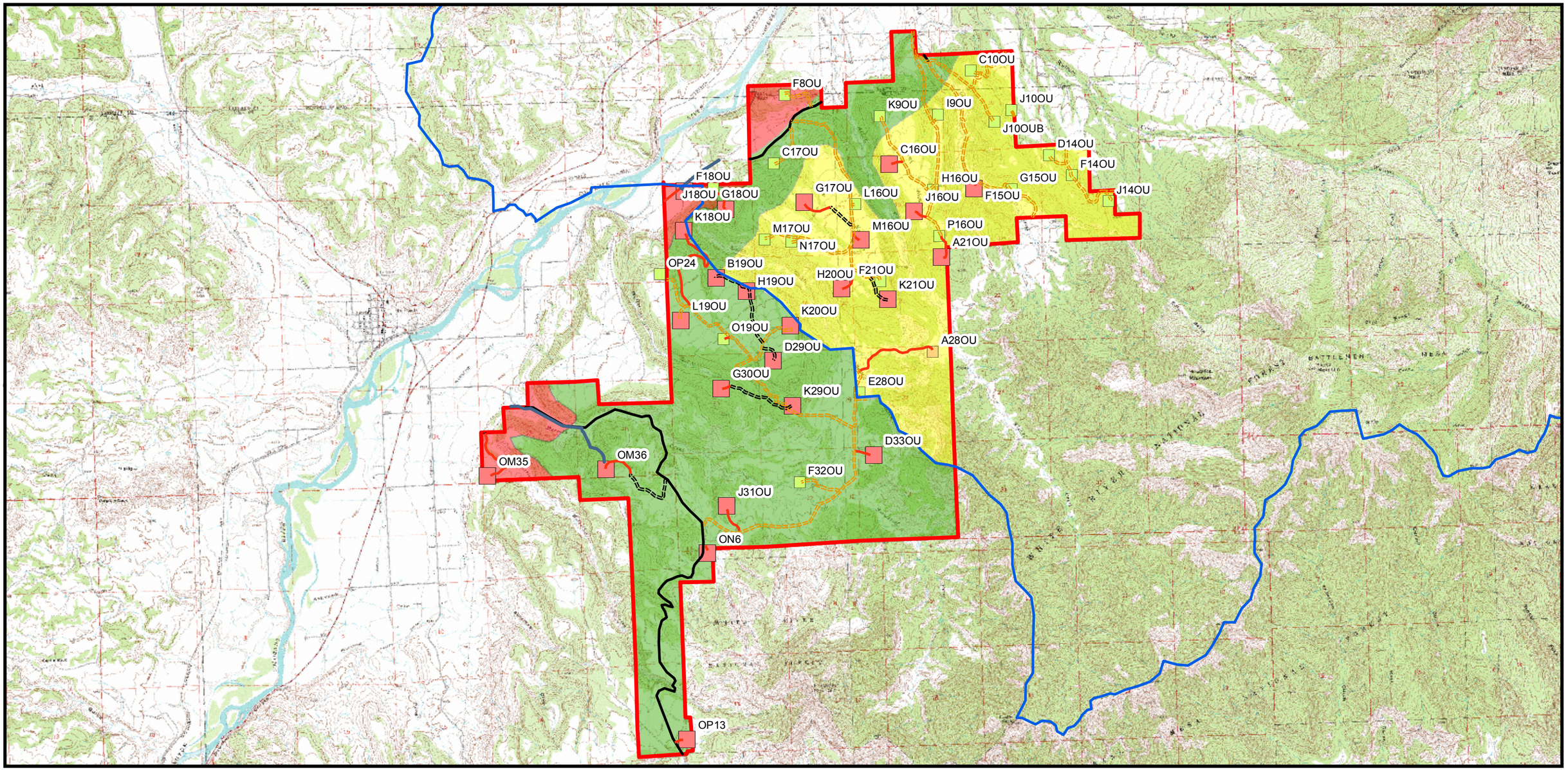
Visual Resource Management Objectives and Classifications

Generally, BLM VRM objectives are to protect the quality of scenic values where high value visual resources exist, and to protect areas having 'high scenic quality, visual sensitivity and public visibility' (GJRMP), including scenery visible from roads, residences, and other highly sensitive areas. Lands within 5 miles of I-70, of moderate to high visual exposure, where details of vegetation and landform are readily discernible and changes in visual contrast can be easily noticed by the casual observer on I-70 (GSRA Amendment, 1999) are considered to be of high visual sensitivity, and in the OMDP area are classified generally as VRM classes II and III, based on RMP classification or lease stipulations.

VRM classes represented within the action area are Class II, III, and IV. The GJRMP also depicts areas that have not been assigned a VRM classification. Those unclassified lands are typically managed as Class III, and shall be treated as such for purposes of this analysis, unless otherwise noted. VRM Class II areas are managed to retain the existing character of the landscape, where the level of allowable change to the characteristic landscape is low. Activities may be seen, but should not attract the attention of the casual observer. Any changes made within a Class II landscape must repeat the basic elements of form, line, color, and texture found in the predominant natural features, and mitigation measures must be designed to blend the disturbance with the characteristic landscape. Approximately 204 acres of the project area fall within VRM Class II and include pads identified in Table 20 and Figure 9. Leases to which oil and gas lease stipulations for scenic and natural values apply would be effectively managed as VRM Class II.

Table 20: VRM classes by pad within the OMDP Area.

Class II	Class III or Unclassified		Class IV	
F8OU (existing)	K9OU (existing)	C17OU (existing)	J10OU	F15OU
F 18OU	O19OU (existing)	G18OU (existing)	C16OU	J16OU
OM35	OP24 (existing)	F32OU (existing)	M16OU	G17OU
K18OU	ON6, J18OU, H19OU, K20OU, K29OU, J31OU, OM36	OP13, B19OU, L19OU, D29OU, G30OU, D33OU	H20OU, K21OU	A21OU



Legend

- Class II
- Class III
- Class IV
- OMDP Boundary
- GJFO GSEO Boundary
- Approved Well Pad
- Existing Well Pad
- Proposed Well Pad

Note: Well pads not to scale

- Proposed Pipeline
- Existing Road
- Road Needing Improvement
- New Road
- County Road

Figure 9: Visual Resource Management Classes within the OMDP.

1 inch equals 5,333 feet
Scale: 1:64,000
Contour interval = 40 '
Date: September 2008

BASE: U.S.G.S 7.5 Minute DeBeque, Grand Valley, Housetop Mountain, and Red Pinnacle, Colorado Quadrangles

0 1 2 Miles

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In the area of the Orchard MDP, BLM's main visual resource management emphasis continues to be to protect scenery visible from highly sensitive Key Observation Points (KOPs), as described. The OMDP VRM impact analysis is based on views from selected KOPs, including the town of De Beque and points along I-70 (Photo 1) and along county-managed roads De Beque Cutoff Road (MCR 45.5 – Photo 2), V Road, V.50 Road, and 300 Road (Una Road).

VRM Class III areas are managed to partially retain the existing character of the landscape, where a moderate level of change to the characteristic landscape is allowable. Activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features, to minimize contrasts with them. Approximately 5,600 acres, the majority of the project area, fall within VRM Class III and include pads identified in Table 20 (Figure 9).

VRM in Class IV areas provides for activities which may require major modifications to the existing character of the landscape. In these areas, alterations may be allowed to dominate the view and may be the major focus of viewer attention but would still require mitigation.
Site-specific considerations of project location and design would lessen impacts in Class III and IV areas by careful positioning of project elements, minimization of disturbance, seeding of disturbed soils, including cut and fill slopes, and repetition of basic landscape elements. Approximately 4,381 acres of the project area fall within VRM Class IV and include pads identified in Table 20 and Figure 9.

Existing Landscape Character and Scenic Quality

At the present time, visual resources across the 12,000 acre OMDP project area are dominated by a mosaic of sage shrublands and pinyon juniper forests (see Vegetation), with some modifications to the natural environment due to human activities, especially on private lands with proximity to I-70 and the Colorado River. In these areas, irrigated agriculture and other residential and commercial land uses typical of human activities are prevalent. Modifications to the landscape include a high-voltage electrical transmission line, multiple two-track roads, fences and gates for livestock management, historic structures, and oil and gas production facilities (e.g., pads, wellheads, separator/ dehydration tanks, product storage tanks, pipelines, access roads) scattered throughout the area. Roads and pipelines associated with the existing development are noticeable but only occasionally dominate the observer's eye. During well construction and development, drill rigs, which are brightly lit at night, would likely be dominant features. Exhaust plumes from machinery may dominate the view on cool and cold mornings, increasing air opacity. Fugitive dust from vehicles traveling dry unpaved roads commonly rises across the area, substantially decreasing visual clarity.

Elevation heightens with distance from the I-70 and the Colorado River. Vegetation communities transition to sagebrush and juniper shrub ecosystems, intermixed with pinyon and some rangelands. Landforms include steep canyons sloping toward the Colorado River floodplain. Ridges and canyons alike are generally covered with a juniper-dominated pinyon juniper forest with small cliffs and exposed areas adding contrast. The tops of the ridges and the bottoms of the canyons tend toward open sage flats and grass rangelands. Colors vary throughout the year. In the spring the green-up of vegetation contrasts with the deep green of the junipers and the tans and grays of the soils. In the late summer and fall, where deciduous shrubs occur, shades of yellow and gold may intermix with the junipers and sage. Winter coloration is typically based in shades of grey. Soil surface colors do not vary during the year, but subsoil is typically lighter colored than surface layers and vegetation, and so, when exposed, tends to contrast clearly with the characteristic landscape in form, color, line and texture, even at a distance.

At the present time, modifications in the OMDP project area generally satisfy the Class III and IV objectives.

Photo 1: Looking south from KOP I-70 into the OMDP.

Photo 2: Looking toward proposed OM35 pad location from KOP De Beque cutoff road.

Sensitive Viewing Areas

Transportation Routes

Project activities within the boundaries of the OMDP project area would be as close as ¾ mile to an I-70 driver, and as distant as 5 miles. The typical 60-degree viewshed of an interstate driver begins with a foreground view of the Colorado River Valley as the highway follows it. For about 12 miles, between Parachute and De Beque, both east- and west-bound motorists would view, in the middle-ground, project area slopes and ridges draining northwest into the Colorado River, affording them views up some drainages. Rising to the background, the view extends beyond the project area to encompass high peaks to the south and east of the project area. Although much of the project area would lie beyond a typical 60-degree viewshed, the valleys and the peaks beyond them are scenic landscapes that draw the eye, and a viewer is likely to take in a broad panoramic viewshed. This increases the likelihood that the attention of many motorists would be drawn across the full depth of the OMDP project area.

Environmental Consequences

Proposed Action

Short-term (typically 3 to 5 years between well pad construction and interim reclamation) visual impacts from construction, drilling, and completion activities would occur on all new pads, roads and pipelines. The existing landscape would be altered by the introduction of contrasting new elements of line, color, form, and texture. Linear features such as roads and pipeline clear-cuts would be among the new elements introduced to the natural mosaic pattern. None of the existing mosaic components is similar to or appears as abruptly as would a new pipeline or road cut. Cut- and fill-slopes associated with roads and pads would also introduce color changes, due to exposure of bare mineral soils in locations where darker native vegetation now cloaks the landscape. Form and texture would be similarly altered by angular shapes and by roads cutting across contours, hardening and breaking up the visual texture of the landscape. Many such contrasting features would face KOPs on I-70 and would likely be visible, even if the pad's location were higher than that of the viewer, due partly to contrasts associated with light-colored subsoils and abrupt elements of line and form, and partly to the panoramic draw of the view. Similar contrasts of form and line would accrue to cut- and fill-slopes. Area vegetation is generally too low and too sparse to block views of large cuts and fills. Such impacts would occur over both short-term and long-term.

New pads, roads, pipelines, production facilities and other surface activities would necessarily increase the presence of drilling rigs, heavy equipment (e.g., dozers, graders, dump trucks, water haulers, pipe trucks, etc.), and lighter vehicular traffic, with associated visual disturbances like dust, air opacity, light pollution, and well flaring (open burning of gas in a pit on a well pad).

Short term construction disturbances are planned to occur over a 2- to 3-year period. At any given location, activity would occur 24 hours per day for the 30- to 60-day drilling and completion phases. Consequently, the drill rigs, other large equipment, lights, and well flares would draw a viewer's eye, especially against the night sky, for up to two months per well drilled upon each pad. The proposed action averages 3.8 wells per pad, which would mean a maximum of 228 days, or 7.6 months of short term visual disturbance, per pad.

During daylight hours, construction and drilling activities at Class III-managed locations would be visible in the middle ground to viewers traveling V.00, V.50 and 300 Roads, but would call more attention at night when they are brightly lit. Such activities would also be visible from the town of De Beque and from I-70, especially activities related to pads F18, OM35, and K18OU, in the more sensitive Class II

area. As a viewer's distance from activities increases, the visual impacts of those activities would lessen. In Class IV areas, which are typically farther from the KOPs, activities would tend to be visible only in the background during daylight hours, again becoming more noticeable after dark, when drill rigs are lit.

Long-term visual impacts of the proposed action would consist of reduced visual character values across parts of the landscape where new pad facilities, pipelines, and roads could not be screened from sight. The visibility of new areas of surface disturbance and production equipment would increase the frequency of existing visual contrasts already associated with human modifications in the OMDP area. Interim reclamation , to recontour and reclaim those portions of well pads that are no longer necessary for long-term production activities, would lessen acres of disturbance and visual impacts of pad construction. Standard (see Appendix D, GJFO No. 24 and GSEO No. 18) and site-specific mitigation measures (Appendix F), including painting production equipment with non-reflective paint in natural color tones (Shale Green), would also mitigate long-term impacts. Adaptive management techniques may be required by BLM staff after impacts have occurred, to mitigate long-term visual impacts. For example, if a high degree of visual contrast was created by cut- or fill-slopes or by margins of pads or pipeline clear-cuts, adaptive BLM COAs provide for removal of additional trees along contrasting edges, to create irregularly shaped openings or more natural-looking mosaic patterns. Seeding, hydro-mulching or erosion blanketing could also be required adaptively, to manage long-term visual impacts of fill slopes supporting roads or pads.

Most proposed surface locations are over a mile from I-70. Normally, disturbance areas located more than a mile from a highway would not be expected to be major visual features, but as previously discussed, due to high contrast and interruption of a panoramic landscape, even disturbances located at a distance greater than 1 mile from sensitive viewing areas could be easy to distinguish from the surrounding landscape. However, successful revegetation or other adaptive visual mitigations would be expected to keep long-term disturbances from being noticeable to a casual viewer, even at a distance as close as one mile.

The well pads and aboveground production facilities with the greatest potential to affect observers at KOPs are those located within 1 mile of them, notably, pads OM35, F18, and K18, designated for Class II VRM management. The existing viewshed would be modified by construction of proposed pads and access roads with potential to dominate the view, again because they would be located relatively close to a viewer, high on a panoramic slope, with little screening by native vegetation. Long and short-term impacts would occur and be visible at different times.

Construction of proposed pads and access roads would also alter the existing viewshed where lease stipulation 2GP (protect scenic values within a highway corridor) applies, most notably at pads OM35, F18OU and K18OU, where roads and pads could dominate the view, again because they would be nearest a highway viewer, be located higher on the slope than existing visual impacts and be minimally screened by native vegetation. Both long and short-term impacts would occur and be visible at different times. Well OM35 is proposed to be located within a half-mile of the De Beque Cutoff Road (MCR 45.50 Rd) and just over a mile from I-70 and the town of De Beque. The eyes of viewers would pass over farms and pastureland in the low foreground, then rise to slopes ascending toward Horsethief Mountain to the southeast. Highly visible in the middle ground, closest to I-70, the access road to the OM35 would be cut and filled across the ascending sideslopes, causing contrasts in all visual design elements, particularly as a consequence of cut and fill construction. The well pad would be somewhat visible from the De Beque Cutoff Road, and quite noticeable from I-70. An existing privately owned road, located along the toe of the slope below proposed new access construction, at a distance of 100 to 400 feet from it and much less visible, if it could be used for partial access, would negate the need for about 0.75 miles of new construction across the side-slope in the most sensitive viewing area. Should the entirety of the proposed new road be constructed, visual impacts would be short- and long-term. Following the onsite inspection,

changes to planned well pad design and construction were added to the proposal to mitigate visual impacts. They included relocating the topsoil stockpile to the east to minimize visual impacts to the north (I-70), and cutting the northwest pad corner sharply to minimize the need for a fill slope clearly visible from the I-70. Trees were noted in areas along the north side of the pad that could help somewhat with viewshed mitigation, and a site-specific COA (Appendix F) should be included requiring them to be left in place as screening.

The K18OU is proposed to sit atop a prominent sage-covered ridge 1.0 to 1.2 miles south from I-70. The eyes of viewers on I-70 would pass over the low-lying foreground and the Colorado River corridor, then rise to the ridge top on which the K18OU pad would perch. A highway driver would have the location in view for a relatively short time, but the location would only be visible for a short time from I-70. The fill-slope at the northernmost corner of the pad and road could be highly visible to motorists because it would create a disruption in the native vegetation and natural landscape forms. Abruptly visible changes to landscape elements in form, line, color and texture would be both long and short term, similar to those described above. The cut- and fill-slopes necessary to construct the pad and access road would create the single most noticeable visual impact, unless well mitigated. Visual impacts associated with this road would be long-term (until the road was removed and native vegetation was again present and of the same size as surrounding vegetation). Following onsite review of the proposed pad and road locations, the designs for the K18 access road and pad were adapted to reduce visual impacts. Specifically, the road is now proposed to follow the contour along the side of the ridge, limiting visual exposure. In areas with potential I-70 viewshed impacts, side-casting of fill should be disallowed, and if fill slopes are absolutely necessarily in view, adaptive management techniques shall be employed to mitigate contrasting effects. Specific mitigation measures designed to minimize the visual impacts of pads OM35 and K18OU are presented in Appendix F.

Visual impacts associated with pad F18OU, located in the Colorado River floodplain with sagebrush and greasewood vegetation providing considerable screening, are not expected to be significant. The location is well back from Mesa County V.50 Road and the river, lying at the foot of the ridges rising to the southeast. Should soils provide contrast, adaptive management shall be applied to mitigate effects on viewers. Low-profile production equipment, lower than 15 feet in height, would also minimize visual impacts and would be required in COAs (Appendix D GJFO No. 24 and GSEO No. 18).

The view of well pad J18OU, the most sensitive Class III location, is obscured from the view of I-70 and most of V.50 Road by a small ridge. The remainder of the proposed Class III pads and access roads (ON6, OP13, B19OU, H19OU, L19OU, K20OU, D29OU, K29OU, G30OU, J31OU, D33OU, and OM36) would not be visible from identified sensitive KOPs, and elements have been designed to repeat those found in the predominant natural features in order to minimize contrasts. With implementation of standard and identified mitigation measures, no more than a moderate level of change to the characteristic landscape is expected. Activities are not expected to dominate a casual observer's view, and the existing character of the landscape should be at least partially maintained.

The remaining pads and associated access roads (J10OU, F15OU, C16OU, J16OU, M16OU, G17OU, H20OU, A21OU, and K21OU) located within areas designated as VRM Class IV (Table 20), would not be visible from I-70, V.00 Road, V.50 Road or 300 Road. Few activities would require allowable major modifications to the existing landscape, and alterations would be mitigated but might occasionally focus a viewer's attention as a dominant activity, permissible within Class IV areas.

With the exception of the OM35, following the implementation of standard and identified mitigation measures and completion of interim reclamation, all proposed new pads located in VRM Classifications II, III, and IV would be expected to satisfy management objectives.

No Action Alternative

A substantial amount (> 44%) of the OMDP project area has or is currently undergoing development activities that were approved under the Orchard Unit Geographic Area Plan (USDI 2005a) and other NEPA documents. These activities are located mainly to the north of the proposed new activities, in Garfield County. Twenty-one well pads and 72 wells have been developed within the project area. One additional pad and 6 associated wells have been approved but not yet developed. Under the No Action alternative, production and maintenance of the existing wells would continue into the foreseeable future and the remaining pad and proposed wells would be developed. While drill rigs may be visible and development activity may be perceptible at night, the effects on visual resources are expected to be minor, due to the small numbers of wells proposed for development.

Wildlife, Aquatic (includes an analysis on of Public Land Health Standard 3)

Affected Environment

The OMDP area encompasses portions of Alkali and Little Alkali Creeks, the Colorado River, Horsethief and Little Horsethief Creeks and Piute Reservoir. Alkali and Horsethief Creeks are ephemeral and thus do not support fish species. The Colorado River supports numerous native and non-native fish species and a variety of aquatic macroinvertebrates. Piute Reservoir is principally seasonally wet and does not impound water for long periods, thus it is devoid of fish species.

Environmental Consequences

Proposed Action

Since the Alkali and Horsethief Creeks do not support fishes, the proposed action would not affect any fish species in these streams. However, during extreme precipitation events erosion and increased sedimentation has the potential to impact fishes that inhabit the Colorado River.

The small amount of sediment anticipated to reach the Colorado River from the OMDP should have minimal impact on fisheries. The amount of sediment would likely be well within the background levels for the Colorado River. Minor increases in sediment associated with the proposed action would be undetectable. Additionally, native fishes of the Colorado River system are adapted to high sediment loads. Effects to listed fish species in the Colorado River are discussed under the Threatened, Endangered and Special Status Species section above. Benthic invertebrate populations likely are low and consist of those species which are evolved to tolerate naturally high sediment loading. Impacts to benthic invertebrates are expected to be low (Fresques 2008). Amphibian populations are not large within the project area and impacts to their habitat are expected to be low.

No Action Alternative

The no action alternative is not likely to impact fish species because of the small scale of development and the lack of local fish populations in creeks within the project area.

Analysis on the Public Land Health Standard for Aquatic Wildlife. The Battlement Mesa Area land health assessment (USDI 2000) did not determine whether or not Standard 3 was being achieved within the Alkali Gulch and Alkali Common grazing allotments. Alkali and Little Alkali Creeks do not currently support fisheries and have limited fisheries potential because of the ephemeral nature of these creeks. The report did state however that as natural gas production and development continues to increase, it will be increasingly difficult to maintain Standard 3 for aquatic wildlife. Although the impacts associated with

proposed action and no action alternative are not considered substantial, they have the potential, at least in a minimal way, to further move the area away from meeting Standard 3.

Wildlife, Terrestrial (includes an analysis on Public Land Health Standard 3)

Affected Environment

The primary vegetation types in the project area are pinyon-juniper woodlands, Gambel oak shrublands, and sagebrush shrublands. Less common are riparian-wetland habitats, small stands of aspen, and disturbed areas. The OMDP area provides cover, sources of food, and breeding habitat for a variety of wildlife. Big game species observed within the OMDP area that are important to Colorado's economy include the mule deer (*Odocoileus hemionus*) and Rocky Mountain elk (*Cervus elaphus nelsoni*). Other big game species likely to inhabit the OMDP area are the mountain lion (*Felis concolor*) and black bear (*Ursus americanus*).

Big Game Ungulates

Big game ungulates observed or otherwise known to occur within the OMDP area include the mule deer (*Odocoileus hemionus*), Rocky Mountain elk (*Cervus elaphus nelsoni*), and bighorn sheep (*Ovis canadensis).* For all three species, the OMDP area consists primarily of winter range for animals that summer at higher elevations to the south on Battlement Mesa and other nearby highlands. The entire OMDP is identified by the Colorado Division of Wildlife (CDOW) as deer winter range, with 3,355 acres (28%) mapped as severe winter range and 5,466 acres (45%) as winter concentration areas (Figure 10). Approximately 11,699 acres (97%) of the OMDP is identified by CDOW as elk winter range, with 710 acres (5%) mapped as severe winter range and 6,246 acres (52%) as winter concentration areas (Figure 11).

The development of well pads and associated infrastructure has occurred in all major habitat types within the OMDP, resulting in habitat fragmentation through the physical loss of habitat and the breaking up of large blocks of habitat into smaller blocks. These previous actions have resulted in the direct removal of approximately 164 acres of habitat, the majority of which occurred in pinyon-juniper habitat. The removal and breaking up of habitat work synergistically to indirectly create habitat effectively lost for use by wildlife.

CDOW manages big game within specific Data Analysis Units (DAUs). Each DAU includes smaller units known as Game Management Units (GMUs). The OMDP lies within deer DAU D-12/GMU 42 and elk DAU E-14/GMU 42. Population estimates of these species are updated periodically by CDOW to determine management objectives based on the carrying capacity of existing habitat. Using updated population data and habitat assessments, CDOW establishes a population goal for each species within each DAU.

The projected mule deer population in DAU D-12 was 26,340 in 2005, compared to the long-term objective (LTO) of 29,500. The estimate for 2005 reflects a gradual recovery from previous major declines throughout much of the region. The harvest objective was set at 1,600 deer (CDOW 2006). Elk numbers in DAU E-14 and throughout Colorado are above the statewide LTO.

Federal leases COC58674, 58675, 64189, and 64191 in the northwestern corner of the OMDP have a Timing Limitation (TL) stipulation (Figure 12) for the protection of seasonally important wildlife habitats (big game winter range). The TLs preclude construction, drilling, or completion activities from December 1 through April 30 but allow activities associated with ongoing production and maintenance of oil and gas wells. The areas with this 5-month TL stipulation include Section 9 (SW¼), Section 17 (all),

Section 18 (NE ¼) Section 19 (E½SW¼, SE¼, Lots 3 and 4), and Section 33 (NE¼) in T8S, R96W, and represent approximately 1,828 acres (15%) of the project area. The remaining leases do not have a TL stipulation for big game winter range, however these areas fall within severe winter range as mapped by CDOW and therefore would be protected to some extent by a 60-day TL (January 1 to March 1) to be applied as a condition of approval (COA) for any well permits.

Environmental Consequences

Proposed Action

Impacts to big game include habitat loss, displacement into less suitable habitat, and increased physiological stress. These impacts are more significant during critical seasons such as spring when calving and fawning occurs or during winter.

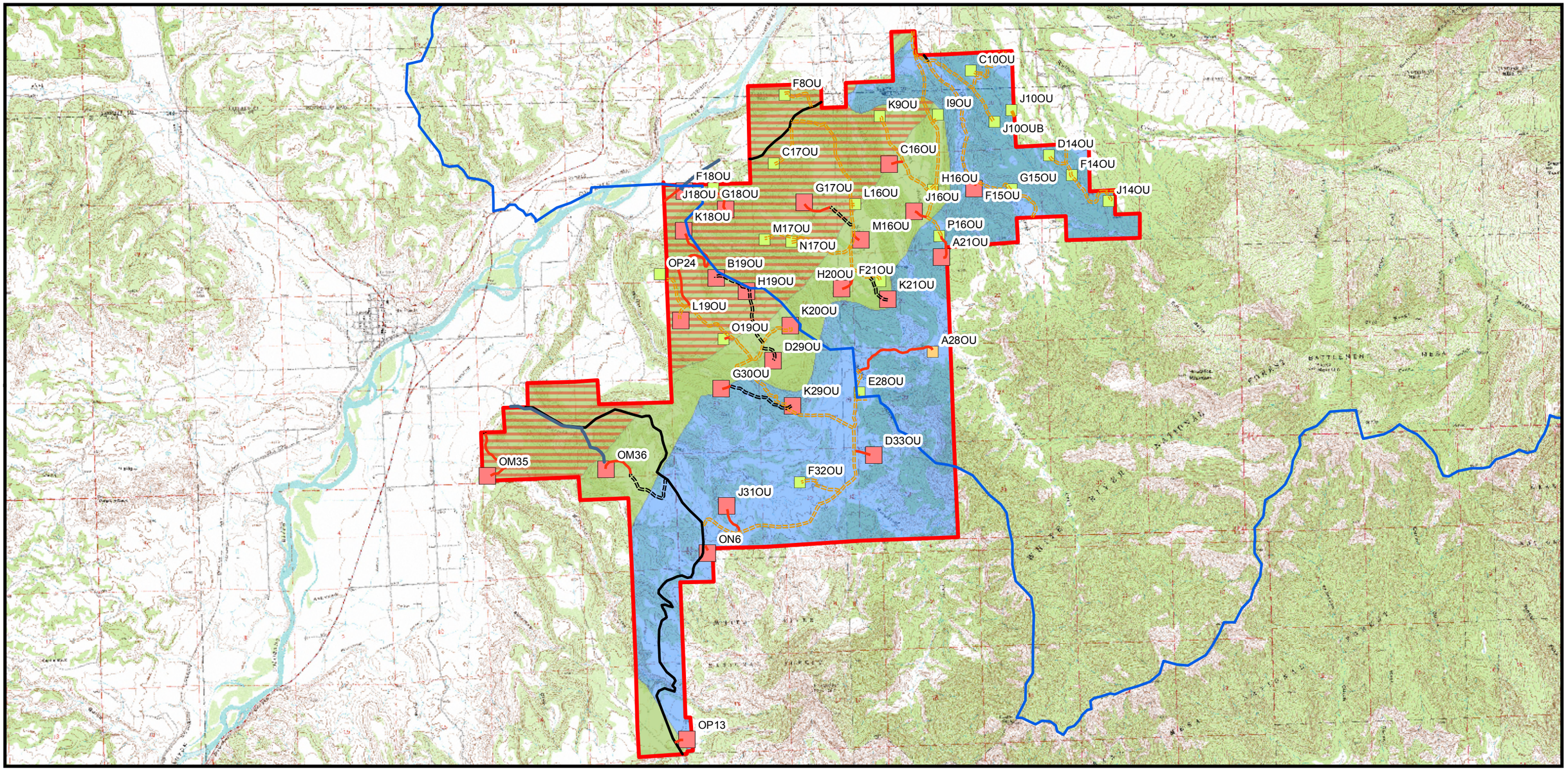
The proposed action is estimated to result in the direct loss of 243 acres of wildlife habitat in the OMDP due to construction of new well pads, access roads, and pipelines (Table 1). Reclamation of pipelines and temporary disturbances associated with road construction as well as interim reclamation of well pads would reduce this total to approximately 70 acres.

The impacts of the proposed action on deer and elk populations cannot be estimated since many variables influence wildlife populations. Harvest could potentially increase since new roads may enable some hunters access to areas previously inaccessible. However, an increase in hunters could also cause deer and elk to seek refuge on nearby private lands where hunter access is limited. Most likely, the proposed action in and of itself will not directly impact deer and elk numbers within their respective DAUs nor affect the management LTO.

A much larger area would be subject to indirect habitat loss as a result of disturbance to sensitive wildlife. Human activity, including vehicular traffic and the operation of heavy equipment, can cause deer, elk, and other species to avoid areas of otherwise suitable habitat. Even when sensitive wildlife do not avoid an area, the changes in their movement patterns can result in greater use of less suitable habitats and increased physiological stress. These impacts are more significant during critical seasons such as winter, when cold temperatures, reduced forage quality, and reduced forage availability due to snow cover deplete their energy stores accumulated during summer and fall.

Another adverse impact of indirect habitat loss can occur in winter range that supports both deer and elk by increasing competition between the species. Although these species compete to some extent for the same foods, particularly during winter, elk are generally able to tolerate colder temperatures, deeper snow cover and can obtain nutrients from browsing and grazing. If disturbance from human activity and infrastructure affects the distribution of elk and causes them to congregate into smaller areas, the elk can outcompete the deer for food and cause them to shift their patterns of use even farther or may cause a 'trophic cascade' in which a dominoes effect occurs and all species are impacted.

Assuming that some displacement of deer and elk does occur, winter range adjacent to the OMDP could also be indirectly affected and decline in quality as a result of increased use of those areas (Bartmann et al. 1992, White and Bartmann 1998). Another potential impact from greater concentrations of animals in areas to which affected animals are displaced is an increased risk for spread of infectious diseases.



Legend

- Severe Winter Range
- Winter Concentration Area
- Winter Range
- OMDP Boundary
- GJFO GSEO Boundary
- Approved Well Pad
- Existing Well Pad
- Proposed Well Pad
- Proposed Pipeline
- Existing Road
- Road Needing Improvement
- New Road
- County Road

Note: Well pads not to scale

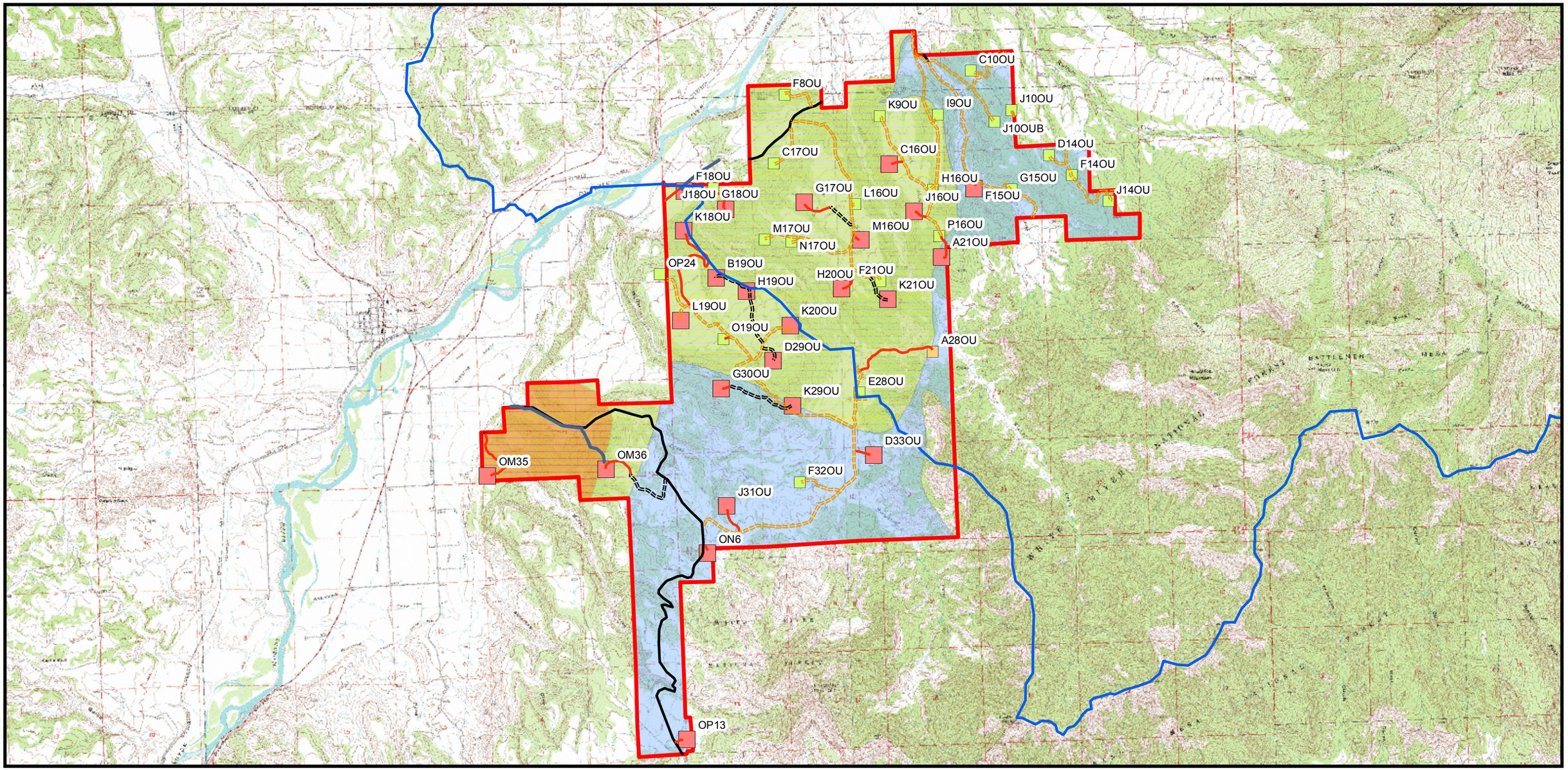
Figure 10: Mule deer winter habitat types within the OMDP.

1 inch equals 5,333 feet
Scale: 1:64,000
Contour interval = 40 '
Date: September 2008

BASE: U.S.G.S 7.5 Minute DeBeque, Grand Valley, Housetop Mountain, and Red Pinnacle, Colorado Quadrangles

0 1 2 Miles

Prepared by: Wildlife Specialties, L.L.C.
P.O.B. 1231 Lyons, CO 80540
303-710-1286



Legend

- Winter Concentration Area
- Severe Winter Range
- Winter Range
- OMDP Boundary
- GJFO GSEO Boundary
- Approved Well Pad
- Existing Well Pad
- Proposed Well Pad

Note: Well pads not to scale

- Proposed Pipeline
- Existing Road
- Road Needing Improvement
- New Road
- County Road

Figure 11: Elk winter habitat types within the OMDP.

1 inch equals 5,333 feet
Scale: 1:64,000
Contour interval = 40 '
Date: September 2008

BASE: U.S.G.S 7.5 Minute DeBeque, Grand Valley, Housetop Mountain, and Red Pinnacle, Colorado Quadrangles

0 1 2 Miles

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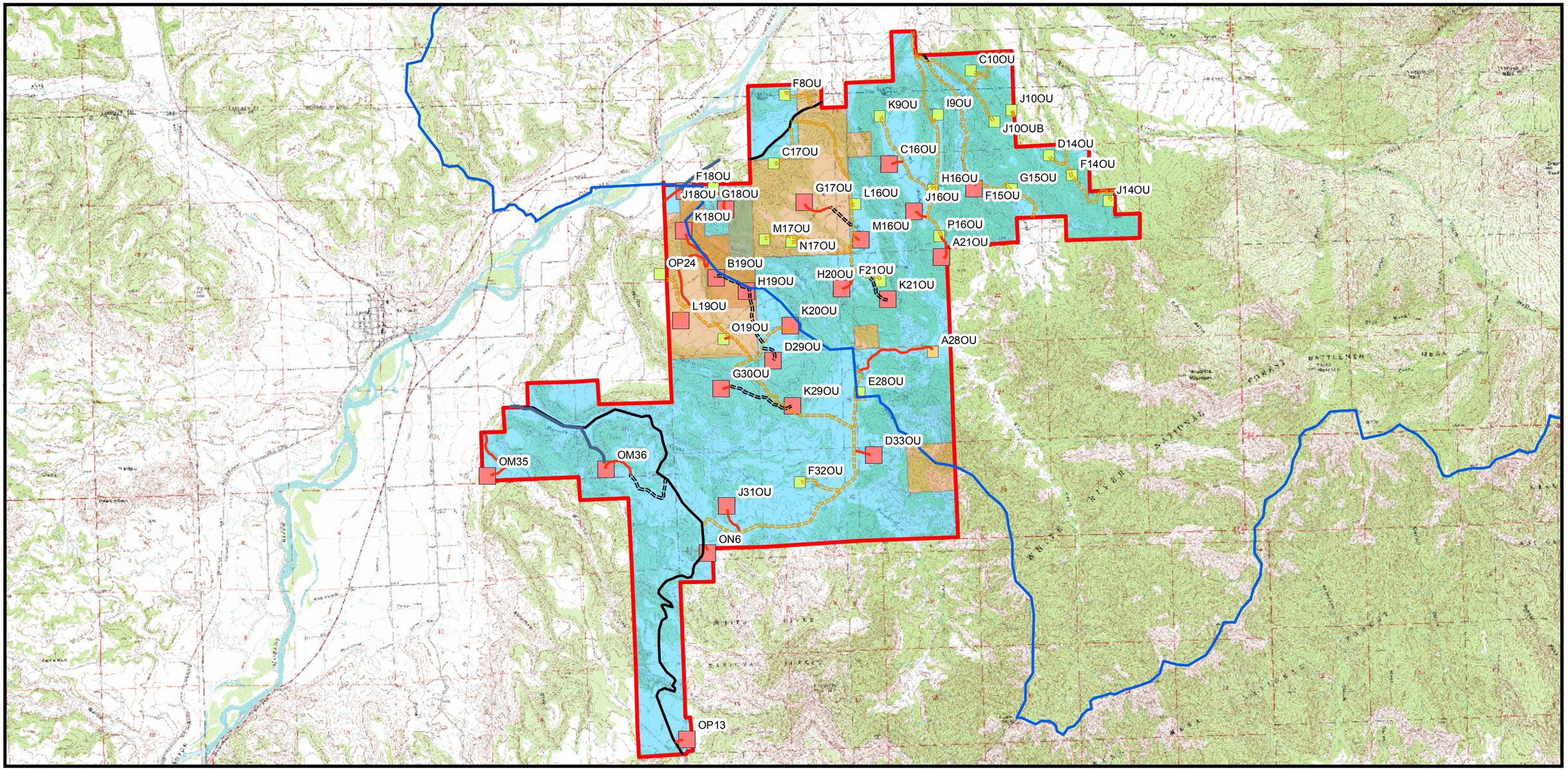

Legend

- Timing Limitations
- 60 Day COA
- OMDP Boundary
- GJFO GSEO Boundary
- Approved Well Pad
- Existing Well Pad
- Proposed Well Pad
- Proposed Pipeline
- Existing Road
- Road Needing Improvement
- New Road
- County Road

Note: Well pads not to scale

N
W E
S

Prepared by: Wildlife Specialties, L.L.C.
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303-710-1286

Figure 12: Mule deer and elk winter habitat protected by Timing Limitations.

1 inch equals 5,333 feet
Scale: 1:64,000
Contour interval = 40 '
Date: September 2008

BASE: U.S.G.S 7.5 Minute
DeBeque, Grand Valley,
Housetop Mountain, and
Red Pinnacle, Colorado Quadrangles

0 1 2 Miles

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The width of areas of indirect impact, or "effective habitat loss," due to relative avoidance of otherwise suitable habitats depends on several variables. These include the type of habitat adjacent to the human activity (availability of topographic or vegetation screening), the extent and quality of habitat into which displaced animals might move, the intensity and duration of the disturbance, the seasonality of the disturbance, and the innate sensitivity of the particular wildlife species. The scientific literature contains a number of references to the width of indirect habitat zones along roads and other areas of disturbance. These include the following:

- For elk, Ward (1976) and Irwin and Peek (1979) reported reductions in use within 400 meters (0.25 mile) of little-used, slow-speed National Forest roads. Hershey and Leege (1976) reported reduced use within 400 meters (0.25 mile) of forest roads in summer range. Lyon (1979) reported that use by elk was reduced by 37 percent within 0.1 mile of a road and by 57 percent within 0.2 mile. Pedersen (1979) and Rost and Bailey (1979) reported that use by elk decreased within 250 meters (820 feet) of paved roads. Czech (1991) reported reduced use within 500 meters of a logging road after it was opened to public use. Frederick (1991) found that 73 percent of use by elk occurred in the 50 percent of an area more than 400 meters (0.25 mile) from a road.

- Both Lyon (1979) and Perry and Overly (1976) noted that the actual extent of reduced habitat use along roads was affected by the amount of vehicular traffic and the density of nearby vegetation cover. Witmer and DeCalesta (1985) found that open spur roads showed a significant reduction up to 250 meters away.

- Regarding the duration of road impacts, Witmer and DeCalesta (1985) found no reduction in use within 250 meters of spur roads after the roads were closed to vehicles. Edge and Marcum (1985) found that elk avoided logging roads by distances of 500 to 1,000 meters on working days but showed no avoidance of the roads on weekends. Similarly, Johnson et al. (1990) reported that elk returned to areas of both summer range and winter range when construction activities that had caused them to leave an area had ceased. Czech (1991) reported that tolerance of logging roads by elk was correlated with the distance to hiding cover.

- In a study of the effects of oil and gas development on elk in southwestern Wyoming, Powell (2003) found reduced use within 500 meters of roads and drill pads during fall, winter, spring, and calving season (early summer). However, he did not collect data for narrower zones, so it is not known whether the overall reduction was uniform or greater in closer proximity to the disturbance, as would be assumed. The habitat type was a sagebrush shrubland with low topographic relief – therefore not completely applicable to the OMDP project area.

- More recently, Sawyer and Nielson (2005) reported that elk showed reduced use of areas within 2.8 kilometers (1.7 miles) of roads on summer range. In winter, the zone of reduced use was 1.2 kilometers (0.75 miles), which the authors attributed to reduced human use of the roads.

- Regarding the duration of impacts on elk from oil and gas development, Hiatt and Baker (1981) found that an oil well drill pad was temporarily avoided but that the access road was not. Johnson et al. (1990) also found that elk avoided oil and gas activities temporarily but returned to these areas when the activities ceased. Knight (1980) reported that elk showed alarm responses when exposed to a continually shifting seismic exploration line but not in relation to regular activities at an oil and gas well pad and access road. Van Dyke and Klein (1996) reported that elk responses to oil drilling activities were not permanent but instead that "elk compensated for site-specific environmental disturbance by shifts in use of range, centers of activity, and use of habitat rather than abandonment of range."

- For deer, Knight et al. (2000) found that use by mule deer was reduced within 200 meters of a road (i.e., the road-effect zone is 200 meters, or 0.125 mile). Lyon (1979) found that the reduction in habitat use was greater in areas of sagebrush than pinyon/juniper, apparently due to difference in the amount of vegetation screening.

- In ongoing studies of oil and gas activities on mule deer in southwestern Wyoming, Sawyer et al. (2007) documented increasing avoidance of access roads during the first 3 years of development, with the average distance from wells to areas of highest use increasing from 2.1 to 3.7 kilometers (1.3 to 2.3 miles). However, deer distribution showed the opposite pattern during the fourth year, with greater use near the wells than remote from them. The authors attributed this reversal in deer winter use to the severe winter. During the fifth year, with a relatively mild winter, deer distribution was the same as during the first year of drilling, which the authors interpreted as possibly indicating some level of habituation.

- In a recent literature review (Hebblewhite 2008) the author concludes that across studies (160+ studies) research showed avoidance responses to human development to be an average of 1000 meters from human disturbance. Disturbance distances were generally greatest in the summer. This may be attributable to more habitats being available in summer months to escape disturbance at a greater distance.

As can be seen from the data presented above, the most commonly cited width of reduced use by deer and elk in relation to roads is in the range of 200 to 3700 meters (0.125 to 2.3 miles). Note that this is "reduced use" or "relative avoidance" and not "total avoidance." In reality, the impact zone is likely to differ among the pads and roads, the severity of the winter season, and the timing, duration, and spatial relationship of areas subject to construction, drilling, and completion activities. The existing TL stipulations on some of the Federal leases in the OMDP area would prohibit construction, drilling, and completion activities on 15 percent of the project area, affecting six pad locations (G17OU, E18OU, K18OU, B19OU, H19OU, and L19OU). Although big game winter range TLs do not exist on the remaining 85 percent of the project area, these areas would have a 60-day TL from January 15 to March 15. As noted above, Sawyer et al. (2006) found that average avoidance distance by mule deer increased during the first 3 years of field development before decreasing in the fourth year and returned to early-development conditions in the fifth year, suggesting that habituation may have occurred. Effects to wildlife are expected to be greater during construction, drilling, and completion than during production and maintenance due to the higher levels of noise and human activity (see **Noise**). Refer to Appendix D (GJFO No. 21 and GSEO No. 16) for specific mitigation related to Terrestrial Wildlife and various site-specific COAs in Appendix F listing timing limitations applicable to certain well pads.

For the majority of Federal leases that do not contain special lease stipulations for protecting wintering mule deer and elk, BLM would apply the 60-day TL (January 1 to March 1) as a COA (Appendix D, GJFO No. 21 and GSEO No. 16). The TL would not apply to routine production and maintenance activities. Under certain conditions, exceptions to the 60-day TL or to the 5-month TL stipulation could be granted at the discretion of the Authorized Officer, upon consultation with CDOW. Exceptions would be granted only if site-specific conditions and/or mitigation measures proposed in conjunction with a request for an exception would ensure that wintering big game are not adversely affected. Compliance with the 5-month or 60-day TLs would reduce impacts to wintering big game by minimizing activity during a portion of the critical winter months.

Other aspects of the proposed action, including best management practices and mitigation measures to which EnCana has committed (see **Operator Committed Mitigation**), would also tend to reduce the severity of adverse impacts to big game ungulates. These include the following:

- From December 1 to May 1 EnCana will use remote sensing for production monitoring, and unavoidable monitoring or maintenance activities shall be conducted between 9am and 3pm as possible.
- EnCana will place a conservation easement on 160 acres of property which EnCana owns (the "Sunny Side" property) that is located within the boundaries of the OMDP. The conservation easement will be held by an entity other than EnCana. Possible entities include the Division of Wildlife and the Mesa County Land Trust.
- EnCana will provide funding of up to $60,000 for the purpose of completing habitat treatments, specifically roller chopping, to offset impacts to areas roller chopped as part of the Sand Wash Fuels Treatment program area. This will be completed via a BLM approved contractor and will improve approximately 500 acres of currently decadent sage brush habitat.
- EnCana will provide an additional $60,000 ($20,000 annually beginning in 2008 and ending in 2011) to the BLM for use within the general OMDP area for wildlife habitat improvement. These funds are not tied to a specific project but will be available for use at the BLM's discretion. Options include but are not limited to:
    - Roller chopping areas in which the sagebrush community is decadent to improve big game forage and increase avian use.
    - Water improvement projects to improve range wide use of the landscape and lessen impacts within a specific area by grazing (wildlife and livestock).
    - EnCana proposes to employ a water distribution system consisting of pipelines (buried within same corridor as gas pipelines) for the purpose of moving produced water offsite. This will reduce the likelihood of spill occurrences and minimize construction disturbance, truck traffic, dust and other impacts to air quality, as well as impacts to fragile soils and wildlife. Exception to this condition may be granted for exploratory wells located at impractical distances from infrastructure (Appendix D GJFO No. 27 and GSEO No. 20).

Threshold Analysis for Mitigation of Impacts to Wildlife and Wildlife Habitat: The current Glenwood Spring Resource Area Land Use Plan (USDI 1999a) requires operators to implement measures to reduce impacts to winter range if developments reach a predetermined level:

> *"Within high value or crucial big game winter range, the operator is required to implement specific measures to reduce impacts of oil and gas operations on wildlife and wildlife habitat.…Measures to reduce impacts would generally be considered when well density exceeds four wells per 640 acres, or when road density exceeds three miles of road per 640 acres* (USDI 1999a:16)*."*

The road and well density threshold analysis completed for the 25 new surface locations, associated access roads, pipelines, and existing development within the boundaries of the OMDP show a total of 46 (21 existing and 25 proposed) well pads within the OMDP. The total well pad density within the OMDP would be one pad per 260 acres. Currently 36 miles of road exist within the OMDP (County, existing, and improved roads) and 6.48 miles of completely new road are proposed, totaling 42.5 miles of roads. Road density therefore is equal to 2.3 miles of road per 640 acres. Both well and road density are below the mitigation threshold.

Although the pad and road density thresholds are met for the GSFO under the proposed action, the GSFO routinely works with oil and gas operators (including EnCana) to identify and implement voluntary mitigation to minimize or offset the impacts that occur even if the threshold is satisfied. Because of the

many variables involved, it is difficult to quantify the amount of compensatory mitigation needed to offset the impacts remaining despite the components of the proposed action specifically included to address big game. Consequently, the GSFO, under its current land use plan (USDI 1991a) has identified a mitigation calculation methodology. This methodology consists of working with the operator and CDOW to identify mitigation equivalent to 24 acres per pad. With a total of 25 new pads under the proposed action, this totals 600 acres of mitigation.

In order for mitigation to be considered successful it must be proportionally offsetting to the impacts during the same time period. For example, a conservation easement on private property (good for wildlife in the future) would not offset the immediate loss of winter range that the current action is causing to individuals existing today. Therefore, any actions identified for mitigation must be timely and sufficient to offset current impacts and impacts associated with future actions (e.g., future well development at existing pads). While the GJFO does not have an established mitigation threshold for oil and gas projects, the following measures, or some combination thereof, would substantially offset the unavoidable impacts to big game winter range and habitat use associated with the proposed action. These measures have been agreed upon among EnCana, BLM, and CDOW.

No Action Alternative

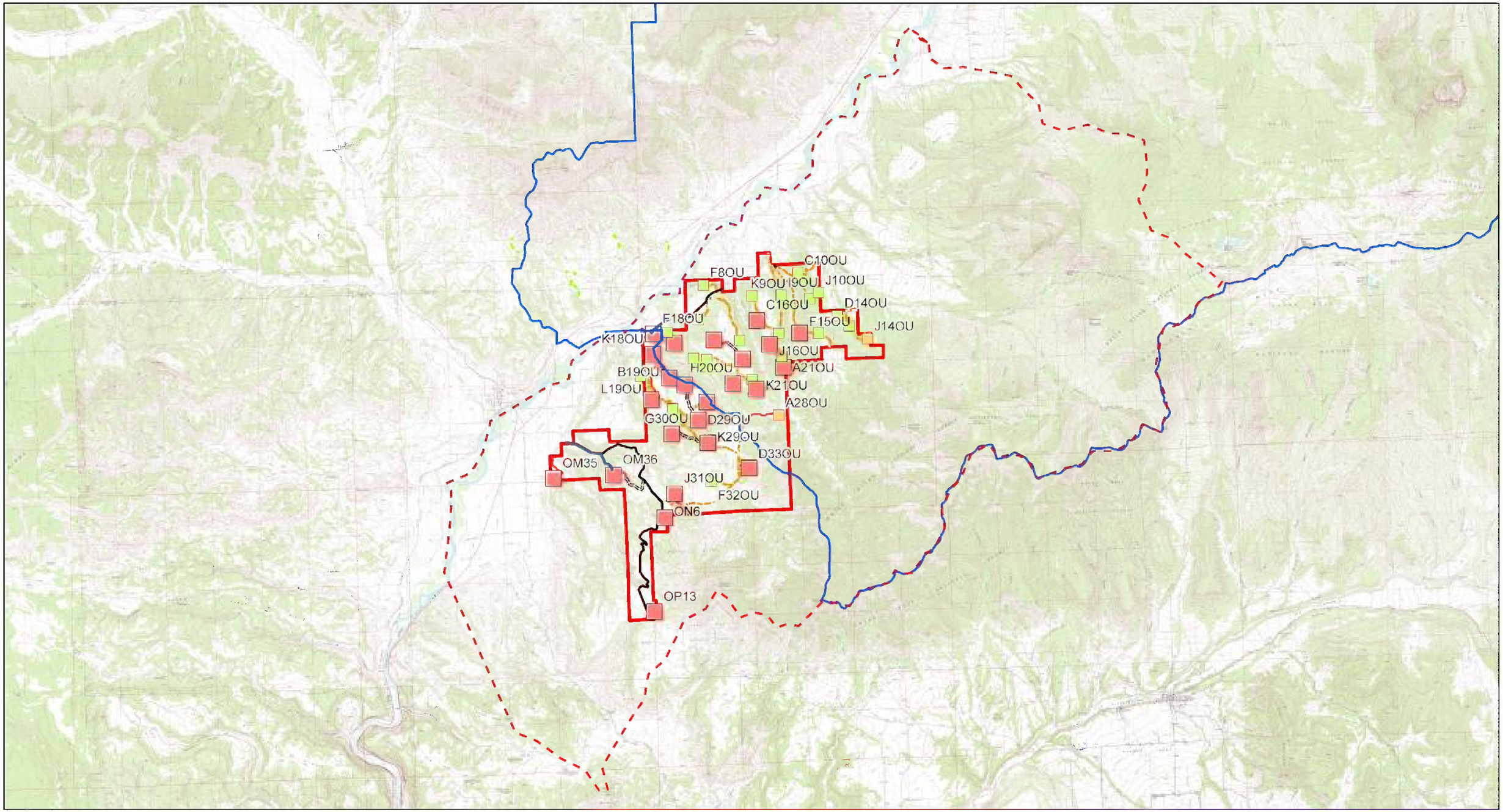
The no action alternative includes the drilling and development of the 22 existing pads and 75 existing wells and associated access roads and pipelines involving Federal surface and/or Federal mineral estate. The majority of the pads and wells have been completed. Since most activities associated with the no action alternative are now in the production and maintenance phase, impacts to wildlife are less than during the construction, drilling and completion phases proposed herein.

Analysis on the Public Land Health Standard for Animal Communities (partial, see also **Vegetation** and **Wildlife, Aquatic**): According to the Battlement Mesa Area Land Health Assessment (USDI 2002)), the current condition of fish and wildlife habitats varies across the landscape. Habitats have been altered by roads, power lines, pipelines, fences, residential development, oil and gas development, and livestock and wild ungulate grazing. Sagebrush habitats vary from poor to good condition with evidence of light to heavy grazing.

Pinyon-juniper habitats also vary in condition. Many sites have a sparse herbaceous understory, while others have a better developed herbaceous component. Pinyon-juniper woodlands are important habitat for nesting raptors and other birds, and provide shelter and cover for a variety of wildlife. According to the assessment, mule deer numbers have decreased dramatically since the late 1980s, while the numbers appear to be increasing for the elk population, which is shifting to a more permanent residency on BLM lands within the Battlement Mesa landscape. In addition, winter range habitats in the area may be at or are above carrying capacity (USDI 2000). Given these conditions, the expected amount of habitat loss and habitat fragmentation from the proposed action could trend the area away from meeting the Land Health Standard for Animal Communities.

Cumulative Impacts Analysis

This section evaluates the cumulative effects of the Proposed Action with past, present, and reasonably foreseeable actions in the geographic setting of the Proposed Action. The cumulative impact analysis is based on watershed boundaries (Figure 13). The areas analyzed consist of the following 5th order watersheds, from northeast to southwest: Colorado River below Rifle Creek, Wallace Creek, Little Alkali Creek, Alkali Creek, an unnamed area that includes Smith Gulch and Moffat Gulch, Horsethief Creek, and Little Horsethief Creek.



Legend

- OMDP Boundary
- GJFO GSFO Boundary
- Approved Well Pad
- Existing Well Pad
- Proposed Well Pad
- Existing Road
- Road Needing Improvement
- New Road
- County Road
- Proposed Pipeline
- Big Game Cumulative Impacts Analysis Area

Figure 13: Mule Deer and Elk Cumulative Impacts Analysis Area.

BASE: U.S.G.S. 7.5 Minute
DeBeque, Grand Valley, Housetop Mountain, and Red Pinnacle, Colorado Quadrangles

Note: Well Pads Not to Scale

1 inch equals 10,000 feet
Scale: 1:120,000
Countour Interval: 40 ft
Date: September 2008

0 2 4 Miles

N W E S

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For each of the evaluated actions, the resources that may be cumulatively affected are discussed in the following paragraphs. Cumulative effects include the effects of past, present, and future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this environmental assessment. According to the Council on Environmental Quality (CEQ), cumulative impacts are "the results from the incremental impacts of an action when added to other past present and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (CEQ 40 CFR 1508.7" (CEQ 2005)). These effects can result from individually minor but collectively significant actions taking place over a period of time. For purposes of this analysis, all past activities within the project area were considered as part of the existing condition and will not be addressed separately in the cumulative effects analysis.

Past Actions

Agricultural Land Conversion – Conversion of sage flats, typically associated with floodplains, into agricultural lands has removed some hiding and thermal cover available to wildlife. Impacts associated with the conversion of native sage flats to agricultural would be most important to sage dependent species, including the sage sparrow and greater sage-grouse. The cumulative impacts analysis area is within the historical range of both species. Neither species is likely to occur in these converted agricultural lands. Other wildlife, specifically mule deer and elk, likely have benefited from this habitat conversion. Irrigated hay fields offer high quality forage to mule deer and elk year-round.

Energy Development – Previous oil and gas development activities include the development or approval of 35 well pads (77.6 acres), improving 10.2 miles of access roads (31.4 acres), 2.6 miles of semi improved two-track road (18.7 acres), 7 miles of new roads (15.3 acres) and 20.6 acres of pipelines not collated with roads has occurred across 5,320 acres of the project area. These have incrementally accrued to cumulative impacts discussed below.

Present and Reasonably Foreseeable Activities

Agricultural Land Conversion – Land currently used for agricultural practices (irrigated hayfields and native range land) near De Beque are likely to be commercially and residentially developed in the near future. Much of this development is reportedly proposed in the area south west of the De Beque I-70 interchange. Additionally, privately owned land on the mesa between Horsethief Creek and Moffat Gulch is being sub-divided for residential development. Both of these actions would occur in habitats (e.g., mule deer winter range) that are limiting to mule deer and elk. Impacts to habitat atop the mesa could affect species dependent upon native sage lands (e.g., greater sage-grouse and sage sparrow).

Energy Development – The Collbran pipeline project (EA # CO130-2007-069) transects the cumulative impact assessment area for 10.3 miles. Existing roads would be used to access the construction workspace. EnCana would use contractor, pipe storage, and off-loading yards on a temporary basis to support construction. These yards have been previously used for similar activities and are located on private lands. The proposed pipeline would generally be installed at the edge of existing pipeline or road corridors and would use a standard 25 foot offset from the existing pipelines. Where paralleling existing roads, the pipeline would be installed immediately under or within the road corridor as much as possible. At certain locations, the proposed route deviates from this standard offset configuration due to terrain and/or environmental features. Using 20 feet as the average width multi-plied by the length of the pipeline results in approximately 25 acres of habitat impacted.

By implementing the proposed action analyzed in the 2005 Orchard Unit GAP EA and gaining information on resource development, the operator has presented the OMDP, which portrays an additional

2- to 3-year drilling plan comprised primarily of in-fill field development, with some exploratory wells planned at the western and southern edges of the OMDP boundary. The 1987 Grand Junction RMP, 1999 Glenwood Springs Oil and Gas Environmental Impact Statement, and 2006 Roan Plateau RMPA/EIS provide the reasonable foreseeable development scenarios.

Cumulative Impacts by Resource

Air Quality

The cumulative activities of EnCana and its contractors within the OMDP will have incremental impacts on air quality in western Garfield County, including increased emissions of volatile organic compounds (VOCs) and particulate matter. High levels of airborne particulate matter can impact visibility and respiratory health, while VOCs are ozone precursors. The increase in these levels due to OMDP activities is unlikely to be significant when compared to all other activities in the region (including those not related to oil and gas development). Furthermore, at present it is quite difficult to isolate one activity, such as oil and gas development, as the source of any decreased air quality except when high levels of certain airborne pollutants are measured adjacent to specific activities or equipment at specific locations.

The GSEO investigated whether it might be requested or required that EnCana perform or contribute funding to air quality monitoring and analysis in the area that could be affected by its OMDP activities. It was concluded that additional monitoring is unnecessary for the foreseeable future, given that:

- An existing network of air quality monitors in western Garfield County monitor PM_{10} (particulate matter smaller than 10 microns in diameter), $PM_{2.5}$ (particulate matter smaller than 2.5 microns in diameter), VOCs (concentrating on non-methane organic compounds and carbonyls), and ozone, all of which are likely to be generated by oil and gas development.
- EnCana is currently operating two continuous, EPA-equivalent ozone monitors on its land north of the town of Parachute, although the data are not yet available to the public.
- Data from monitors gathered from 2005 to 2008 suggest that air quality across western Garfield County, as measured by concentrations of the above compounds and particulate sizes, is currently not impacted to a level of concern in spite of the present intensity of oil and gas development in the area.
- Federal funding is in place or committed for continuing and focusing these monitoring efforts over the timeframe covered by this document.

Cultural Resources/Native American Concerns

Cumulative impacts to cultural and Native American areas of concern include administrative actions, energy development, off highway vehicle use (OHV), and private lands management. Impacts associated with these actions vary based on the accessibility and numbers of public and energy personnel within the OMDP. The minimal unit of analyses used in this cumulative impact assessment is the OMDP boundary.

Prior to the approval of previous energy development projects human use of the OMDP area was low and principally limited to hunting and grazing. Roads were typically low-density two-tracks that did not significantly increase the access or the numbers of the public that now have access.

The acreage investigated by the Class III inventories amounted to 4358 acres, or 36.5% of the total area within the OMDP boundary. The OMDP study area includes 292 recorded cultural resources. This is a relatively high resource density (1 resource per 15 acres). The addition of 8 miles of new or improved roads, 15 miles of pipeline, and 23 well locations to the previously approved 15 well locations and 5.8

liner miles of road and pipelines will inevitably increase the potential for cultural resource vandalism on sites that were previously either difficult to reach, or inaccessible. Residential expansion into the areas surrounding the OMDP will also increase the potential for impacts due to the general public using the developed roads for recreation as well as creating new user created trails/roads exacerbating the possibility of cultural vandalism.

Cumulatively, all these actions that have occurred or are reasonably certain to occur will result in a greater potential threat to cultural resources. A previous study of vandalism to cultural resources in oil and gas fields in southwestern Colorado has shown that "ease of access has a tremendous effect on site vandalism" (Nickens 1981) and that most vandalism occurs within ¼ mile of roads (ibid). Additionally, the proximity of the proposed actions could adversely impact site significance by changing the setting, location, association, and feeling of area, thereby altering the environmental setting in the vicinity of cultural and Native American resources. This is particularly true for culturally sensitive Native American sites and/or areas of concern and Traditional Cultural properties. All but 29 cultural resources are with ¼ mile of an existing or proposed OMDP access road.

In summary, these changes may not be quantifiable at the level of individual sites, but the cumulative effects of these changes over time and over the entire OMDP area could result in degradation of the condition and integrity to most sites due to the potential for increased surface collection and casual travel (which may physically impact sites); and to the integrity of setting, location, association, and feeling for which the surrounding landscape is a part of the site's significance.

Cumulatively impacts to cultural and Native American sensitive areas are increasing regularly with the rapid expansion of industrial and residential land conversion and energy development. The mitigative actions identified in the COA's (Appendix D, GJFO No. 26 and GSEO Nos. 3 & 4) should help to keep the direct, indirect and cumulative impacts at an acceptable level which hopefully will not cause significant impacts to cultural resources.

Invasive Non-native Species

Noxious weed populations are a threat to land health as they contribute to loss of rangeland productivity, increased soil erosion, reduced species richness, reduced wildlife habitat quality, and reduced aesthetic quality. Surface-disturbing activities create conditions favorable for the invasion and establishment of noxious weeds and other invasive non-native species, particularly when these species are already present in the surrounding area. In addition, heavy machinery and vehicles used by oil and gas personnel have the potential to transport weed seed from other areas. Livestock and wildlife movement also transport weed seed as well as recreational use.

Cumulatively, ground disturbing activities within the OMDP, including the Collbran pipeline, past energy developments and future residential development would result in a minimum of 260.6 new acres of ground disturbance. Because a variety of invasive, non-native species are already present within the OMDP, the potential for invasion following construction activities is very high. However, invasive weeds such as cheatgrass are already pervasive throughout the area and the likelihood of additional species or new concentrations becoming established within the action area is small due to competitive exclusion from existing populations. With implementation of mitigation measures designed to minimize the spread of invasive non-native species (Appendix D, GJFO No. 18 and GSEO No. 13), the cumulative effects of invasive non-native species within the project area would be reduced.

Migratory Birds

Cumulative impacts to migratory birds include administrative actions, energy development, livestock grazing, off highway vehicle use (OHV), and private lands management. Impacts associated with these actions vary based on the home range size of the impacted species and the ability for these species to avoid areas that are directly impacted (i.e. large animals can often avoid a direct impact by fleeing, whereas smaller animals are less likely to avoid encounters). The minimal unit of analyses used in this cumulative impact assessment is the OMDP project area. This will ensure that impacts to smaller organisms with smaller home ranges (e.g., sage sparrow) are adequately assessed.

Avian species of concern include the pinyon jay, black-throated gray warbler, Virginia's warbler, gray vireo, and sage sparrow. Cumulative impacts to the black-throated gray warbler, Virginia's warbler, and gray vireo are not expected to occur because of either low densities in the project area or the apparent ease at which some species (i.e., black-throated gray warbler) adapt to habitat modification.

Human use of the OMDP was low and principally limited to hunting and grazing prior to the approval of previous energy development projects. Roads were typically low-density two-tracks that did not significantly fragment habitat or reduce vegetation. Impacts to pinyon jays were likely very low. Based on the amount of acreage available in the OMDP and the home range size necessary to support a colony, it is estimated that one colony could have used the project area during the nesting season. This likely is no longer true because of habitat fragmentation. A 1/3 mile buffer around all approved, existing, and proposed pads (infrastructure not included) within the OMDP spilled beyond the boundary of the OMDP and effectively removed potential nesting habitat from 8,305 acres. Cumulatively, all the actions that have occurred or are reasonably certain to occur will result in habitat fragmentation and loss such that the OMDP is eliminated as suitable pinyon jay nesting habitat.

Sage Sparrow – Isolated stands of intact non-fragmented sagebrush smaller than 321 acres do not support sage sparrows (Paige and Ritter 1998). Samson Mesa (474 acres of mapped sage habitat) is the only area within the OMDP that is large enough to support sage sparrows, however, this area is fragmented with roads and existing well pads. The combined impacts of habitat fragmentation, nest predation, and changes in vegetation has resulted in the OMDP not having intact stands of sagebrush habitat capable of supporting sage sparrows.

The mitigative actions identified in **Operator-Committed Mitigation** and conditions of approval (Appendices C and F) will help to keep the direct, indirect, and cumulative impacts at a level which will not cause a significant impact to avian populations within the cumulative analysis area.

Special Status Species

The unit of analysis used in this cumulative impact assessment is the OMDP project area. Impacts associated with past, present and reasonably foreseeable future actions are discussed below for each special status plant and wildlife species with habitat or occurrences in the OMDP.

Federally Listed, Proposed, or Candidate Plant Species

Colorado Hookless Cactus – Past energy developments (USDI 2005a) for the Orchard Unit GAP did not directly or indirectly affect the Colorado hookless cactus as none were found within the project boundary. Reasonably foreseeable actions include the Collbran pipeline project which would start south of the OMDP on National Forest lands and run through the center of the OMDP, continuing north after exiting the OMDP boundary. Colorado hookless cactus individuals were found along the proposed Collbran pipeline route; however, none of those individuals were within the OMDP boundary. Consultation with

the USFWS on the Collbran pipeline led to the determination of "may affect, likely to adversely affect" the Colorado hookless cactus (WWE 2008).

The OMDP project itself would not directly affect any Colorado hookless cactus, however indirect effects due to increases in dust, weed invasion, OHV use, erosion and sedimentation, and decrease in pollinators and their habitat would occur. Cumulatively, indirect effects are likely to be larger than those for each past, present, or future activity in itself. Cumulative impacts from dust may be especially noticeable with not only the increased disturbance of new well pads, roads and pipelines, but with increased traffic along existing roads. County Road W, which occurs 50 to 558 feet (15 to 170 m) north of the majority of the Colorado hookless cactus within and adjacent to the OMDP, is of particular concern. Oil and gas traffic will increase on this road to access many new proposed pads within the OMDP. The County has been applying deicer to this road in the winter and magnesium chloride in the summer. These treatments have been shown to affect plants in various literature, but it is unknown whether the Colorado hookless cactus along the County Road has been negatively affected because this population was just discovered.

Impacts from dust would decrease as activity within the project area moves from construction and completion phases to production and operations/maintenance phases; however, roads will continue to create dust impacts. Dust abatement on roads within the OMDP would be enforced. In addition, site-specific COAs for rare plant monitoring would allow early detection of impacts from dust, weeds, OHVs and erosion issues and require mitigation of impacts when necessary. The cumulative effects to the Colorado hookless cactus within the OMDP are not expected to cause adverse impacts to this species.

DeBeque Phacelia – No direct impacts to DeBeque phacelia plants or occupied DeBeque phacelia habitat have occurred or will occur with past, present, or reasonably foreseeable future energy developments. However indirect effects due to increase in dust, weed invasion, OHV use, sedimentation and erosion, and a loss of pollinators and their habitat may occur. In addition, changes in livestock movement patterns due to the proposed action have the potential to increase disturbance to DeBeque phacelia populations. For example, cattle often favor newly reclaimed areas which provide more palatable forage. Such areas will occur along the length of the Collbran pipeline and along each new road and pad. There are known locations of DeBeque phacelia approximately 200 feet (60 m) east of the Collbran pipeline between proposed pads ON6 and OP13 within the Sunnyside Common Range Allotment managed by the GJFO. If cattle concentrate in newly reclaimed areas of the Collbran pipeline, trampling of adjacent DeBeque phacelia plants could potentially occur. Increased OHV use due to increased public access could also threaten populations of this plant. However, site-specific COAs for rare plant monitoring would allow early detection of impacts from dust, weeds, OHVs and erosion and require mitigation of impacts when necessary. The cumulative effects to DeBeque phacelia within the OMDP are not expected to cause adverse impacts.

BLM Sensitive Plant Species

Adobe Thistle – Under the proposed action, approximately 344 adobe thistle plants would be lost. In addition, the Collbran pipeline may directly impact an additional 331 plants (WWE 2007) which occur within the pipeline ROW. Indirect effects due to increases in dust, weed invasion, OHV use, sedimentation and erosion, and a loss of pollinators and their habitat may also negatively affect the adobe thistle. However, many thousands of adobe thistle plants occur within the project area. Additionally, adobe thistle has been found to colonize newly disturbed areas and may therefore colonize suitable soils of reclaimed areas. Site-specific COAs for rare plant monitoring would allow for early detection of any indirect impacts to this species, so it is unlikely that accumulating effects would adversely impact this species.

DeBeque Milkvetch – Under the proposed action, approximately 970 DeBeque milkvetch plants would be lost. These losses would occur if the OM35 pad and access road are not denied. No DeBeque milkvetch would be impacted by the Collbran pipeline project and no DeBeque milkvetch is known to have been impacted by past energy developments in the area. Changes in livestock movement patterns would unlikely affect populations of this plant as they occur on extremely steep rocky terrain where cattle are unlikely to graze. As with the other special status plant species, indirect effects due to increases in dust, weed invasion, OHV use, erosion and sedimentation, and decrease in pollinators and their habitat may occur. However, site-specific COAs for rare plant monitoring would allow early detection and mitigation if necessary. Therefore, the cumulative effects to the DeBeque milkvetch within the OMDP are not expected to cause adverse impacts.

Federally Listed, Proposed, or Candidate Wildlife Species

No Federally listed, proposed, or candidate wildlife species exist within the impact assessment area. Prior to consultation with the U.S. Fish and Wildlife Service is provided in Appendix E. Cumulative impacts are not expected to cause adverse impacts to Federally listed, proposed, or candidate wildlife species.

BLM Sensitive Wildlife Species

Reptile species of concern with a portion or all of their range within the project area include the Great Basin spadefoot toad (toad), midget faded rattlesnake and milk snake. Cumulative impacts to the great basin spadefoot toad and milk snake are not expected to occur because of their low densities in the project area. A midget faded rattlesnake hibernacula could exist near pad OM36 based on observations of young near the proposed pad location. Therefore the GJFO has identified specific COAs for the protection of midget faded rattlesnakes near OM36 (Appendix F).

Wetlands and Riparian Habitats

While there are wetland and riparian habitats within the OMDP area, none of these have been or would be impacted by past, present, or reasonably foreseeable energy developments within the project area. However, a number of ephemeral drainage crossings associated with roads were coordinated with the U.S. Army Corps of Engineers (Corps) for past actions, and would be for present and future energy developments. More specifically, the proposed action would result in three temporary impacts to intermittent streams with bankfull widths greater than 2-3 feet, associated with either at-grade low water crossings and/or the installation of drainage culverts for road crossings and collocated pipelines. There would be also be a few temporary impacts to very small ephemeral drainages 1-2 feet wide, mainly located on Lucus, Samson, and Creek Mesas. An additional seven ephemeral drainage crossings would occur with the Collbran Pipeline (WestWater Engineering 2007) project. The majority of these crossings would be 2-4 feet wide; however, the crossing of Horsethief Creek will be approximately 20 feet wide. Crossings would be of either low-water crossing type or culverts. Any other private actions within the project area have the potential for additional impacts to small ephemeral drainages; however, the majority of these are regulated by the Corps and avoidance or impact minimization would be required. Livestock grazing can also negatively affect wetland and riparian habitats. If the proposed activities were to cause an increase in sedimentation to stock ponds or other water improvement projects, livestock could excessively congregate along the few wetland or riparian habitats present in the project area. Cumulatively, the largest effects to streams, wetlands, and riparian habitats would be from sedimentation, which can bury vegetation, alter stream flow characteristics, clog culverts and other water conveyance structures, and lower water quality. However, with the implementation of BMPs and several mitigation measures for groundwater/soils, reclamation, water quality, stormwater management, and road and drainage crossing construction (Appendix D, GJFO Nos. 3, 6, 9, & 18 and GSFO Nos. 6 and 13) these cumulative impacts are not expected to adversely affect wetland and riparian habitats.

Range Management

Past energy developments within the project area have resulted in the decrease of approximately 4.3 AUMs of forage (USDI 2005). Under the current proposal, an additional 5.4 AUMs of forage would be lost in the long term. Given that all of the range allotments together total over 1,300 AUMs, the loss is relatively minor. However, other indirect effects of the past, present, and reasonably foreseeable energy developments have the potential to indirectly affect livestock grazing management. For example, the volume of traffic on existing and future roads will adversely impact movement of livestock, which can lead to problems in range utilization and possibly increase overgrazing in certain areas. In addition, there could be additional problems with fence and cattleguard function, which could allow livestock to leave the allotments or increase costs for maintenance. At some point the additional costs of maintaining range improvements, coupled with decrease in AUMs, could force financially marginal operations to fold. Such problems have affected one permittee on GJFO's Sunnyside Allotment, to the point of no longer using the allotment. Other cumulative effects include soil disturbance associated with construction, which can increase sedimentation in livestock ponds, which decreases water availability and distribution. Cleaning of such water improvements may increase costs to the permittee. Several mitigation measures are presented in the Standard Conditions of Approval (Appendix D, GJFO No. 20 and GSEO No. 12) which require EnCana to pay for any range improvements impacted by oil and gas development activities and site-specific mitigation measures to install livestock gates in certain areas (Appendix F). Cumulatively, adverse impacts to range management are expected to be low.

Recreation

The proposed action would include the construction of approximately 8.76 miles of new two-track roadway and widening or other improvements to another 4.5 miles of existing roadway. This surface area disturbance is minor compared to the amount of regional development, which is expected to include additional energy, residential and limited commercial development. However, the proposed action would provide increased access into a previous remote area, which may facilitate increased motorized recreational and other uses of the area, and may decrease the visitor experience for backcountry users such as hunters.

The impacts of the proposed action would contribute to increased cumulative impacts. However, the proposed action was developed to minimize these impacts, and COAs and mitigation measures would further reduce impacts resulting from the proposed action. Standard Conditions of Approval are presented in Appendix D (GSEO No.15).

Soils

Total surface disturbance of the 12,067 acre OMDP project area is expected to reach 165.9 acres or 1.4% of the project area. This includes the past oil and gas developments (99.3 acres) and the proposed action (66.6 acres). In the short term, surface disturbance would reach approximately 260.6 acres for the OMDP and Collbran pipeline projects. In addition, the nearby residential development on privately owned land on the mesa between Horsethief Creek and Moffat Gulch would also increase soil disturbance as would any increase in recreational OHV use. Cumulatively, these short-term and long-term soil disturbances have the potential to increase sedimentation or chemical pollution to nearby streams that in turn would adversely affect water quality for aquatic life, livestock, recreation, or other uses.

However, with implementation of BMPs, several standard COAs (Appendix D, GJFO Nos. 3, 6, 16 & 18 and GSFO Nos. 6 & 13) for groundwater/soils, stormwater management, temporary seeding, reclamation, and water quality as well as site-specific COAs for fragile soils (Appendix F), the erosion rate and

potential sediment yield should soon drop to near baseline conditions, and no adverse cumulative effects are expected.

Vegetation

Long- term loss of vegetation within the 12,067 acre OMDP project area is expected to be 165.9 acres or 1.4% of the project area. This includes past energy development (99.3 acres) as well as current proposed development (66.6 acres). There would be no long-term loss with the Collbran pipeline project as it is to be buried and reclaimed. In addition, residential development on private lands between Horsethief Creek and Moffat Gulch would add additional acres of lost vegetation.

Cumulatively, these impacts would reduce the total amount of vegetation available for wildlife forage and cover and livestock grazing. In addition, reclamation of the 260.6 acres (2.2% of project area) of proposed short term disturbance for the OMDP and Collbran pipeline projects would result in a shift of plant communities from woodland and shrubland ecosystems to herbaceous communities. The possibility of future periodic workovers and additional bores would likely perpetuate these reclaimed areas in an early seral state. Although the sagebrush shrublands would regenerate over time, this process could take up to several decades, depending on the growth and persistence of seeded species and the intensity of grazing by livestock and/or wildlife. Pinyon-juniper woodlands could take hundreds of years to return to pre-disturbance conditions. The long-term effect would be changes in species composition and structure, and potential changes in fire regime over approximately 2.2% of the project area.

Wildlife, Aquatic

A combination of a lack of suitable habitat within the project area and the evolutionary biology of native aquatic species results in no cumulative impacts. The Colorado River naturally carries a high sediment load, thus native fishes have evolved to function in this type of environment. Any additional sediment loading to the Colorado River would be insignificant when measured against the natural load.

Wildlife, Terrestrial

Cumulative impacts to wildlife include administrative actions, energy development, livestock grazing, off highway vehicle use (OHV), and private lands management. Impacts associated with these actions vary based on the home range size of the impacted species and the ability for these species to avoid areas that are directly impacted (i.e. large animals can often avoid a direct impact by fleeing, whereas smaller animals are less likely to avoid encounters). The unit of impact assessment is the south side of I-70 in game management unit 42 from Parachute west to De Beque Canyon. This will allow for cumulative analyses to a distinct segment of the mule deer and elk populations impacted either spatially (the OMDP project area) or temporally (all other energy development, private land management, etc.) that additively reduce the habitat quality and quantity.

Mule Deer and Rocky Mountain Elk – Analysis of cumulative impacts to mule deer and elk was conducted using GIS software (ArcGIS 9.2) with the analysis area based on deer and elk home range sizes and sixth order hydrologic units (Figure 13). All of the previously noted Past, Present, and Reasonably Foreseeable Activities have had a cumulative impact upon mule deer and elk. Not all of these impacts are deleterious, e.g., the conversion of sage flats to irrigated alfalfa and grass hay production has likely increased carrying capacity. The CDOW tries to manage mule deer and elk at carrying capacity based on input from land management agencies and public participation (Duckett personal communication). Carrying capacity is not static, but varies based on human (direct habitat loss and avoidance) and environmental (drought, etc.) factors.

Total acreage within the mule deer and elk cumulative impact analysis area is approximately 73,312 acres. Within the analysis area, land ownership is as follows: private 26,722 acres (36%), BLM 24,622 acres (34%), USDA Forest Service 21,535 acres (29%), and Bureau of Reclamation 434 acres (< 1%). All limiting habitat types as mapped by CDOW (i.e., severe winter range, winter range, and winter concentration areas) were intersected with the analysis area boundary. Direct habitat loss (e.g., roads, residential development, etc.) that has occurred or is likely to occur was digitized in GIS based on 2006 National Agricultural Imagery Program (NAIP) aerial photography. All roads (County, improved, and two-track) were digitized in GIS and assigned an average width of 20 feet to allow for conversion of square miles of roads into acres of limiting habitat type lost. Impacts associated with energy development since 2006 not portrayed on the aerials were obtained from the BLM and the acreage included in this analysis. Roads were buffered by 0.125 miles (see **Wildlife, Terrestrial**) to identify indirect habitat loss due to reduced use. Buffers were created using the dissolve feature in GIS to ensure that acreage was not double counted. Direct and indirect cumulative impacts to habitat were combined to show total limiting habitat impacted to date.

Effects for these species include the construction and drilling phase and the operations and maintenance phase. Limiting habitat types for mule deer within the analysis area are as follows: winter range 50,773 acres, severe winter range 17,582 acres, and winter concentration area 29,130 acres. Limiting habitat types for elk within the analysis area are as follows: winter range 52,895 acres, winter concentration area 22,068 acres, and severe winter range 6,339 acres. Impacts will vary based on the level of activity associated with each phase (e.g., more noise during drilling, less noise and human disturbance post construction, etc.), duration, season, and time of day. Impacts to each limiting habitat type per impact type are shown in Tables 21 and 22 on the following page.

Although residential development represents < 0.1 percent (753 acres) of the analysis area, it accounts for the majority of total impacts within each habitat type (Tables 21 and 22). This is because most residential development is located in the valley bottoms where critical habitat types and private land overlap. As habitat is directly lost, a proportional decrease in the number of mule deer within the project area is also likely. Since the CDOW manages wildlife at carrying capacity, one must assume that all habitats are at carrying capacity - otherwise there would not be population fluctuations based on changing environmental factors (e.g. , decrease in habitat quality and quantity during droughts).

Carrying capacity can fluctuate annually and is influenced by human (real estate development will decrease carrying capacity whereas habitat improvement can increase carrying capacity) and natural causes. Evidence supporting the following three points must be provided to disclaim the idea that habitat is at carrying capacity and therefore a direct loss of habitat equates to a direct reduction in the population:

1. Habitats surrounding the impacted areas are suitable for occupation.
2. Wildlife populations in surrounding habitats are not at carrying capacity.
3. If not for immigration of wildlife displaced by these direct cumulative impacts, the mule deer and elk populations in the surrounding habitats would not increase to carrying capacity.

Long-term impacts to deer within the cumulative impact area are not limited to direct habitat loss but also include indirect impacts. Indirect impacts can result in a “compaction” of habitat use, in which areas away from disturbance hold greater numbers of deer than if the landscape were not fragmented and subject to continuing disturbance. However, habituation during the production phase can reduce these impacts for those animals living today. These combined long and short-term direct and indirect factors can and likely will lead to a reduction in the local population. However, the long-term impacts to mule deer, because of direct and indirect impacts and how this relates to a reduction in habitat use and survivability, has not been assessed.

Table 21. Acres of Mule Deer Habitat Cumulatively Impacted (Direct and Indirect).								
Habitat Type	Interstate 70	Cleared (mined and/or scraped)	Ponds	Existing Pads	Residential Development	Roads (miles)	Total Acres Impacted	% Impacted
Severe Winter Range	174	59	76	68	667	379 (157)	1423	8.1
Winter Conc. Area	174	58	76	172	674	573 (237)	1727	6.0
Winter Range	174	60	76	296	716	379	1701	3.4
Habitat Type	**Acres Indirectly Impacted (0.125 mile road buffer)**							
Severe Winter Range	13,597							77
Winter Conc. Area	21,454							74
Winter Range	30,708							60
Habitat Type	**Combined Direct and Indirect Acres Impacted**							
Severe Winter Range	15,019							85
Winter Conc. Area	23,179							80
Winter Range	32,408							64

Table 22. Acres of Elk Habitat Cumulatively Impacted (Direct and Indirect).								
Habitat Type	Interstate 70	Cleared (mined and/or scraped)	Ponds	Existing Pads	Residential Development	Roads (miles)	Total Acres Impacted	% Impacted
Severe Winter Range	4	<1	22	<1	457	117	600	9.5
Winter Conc. Area	28	<1	41	142	522	415	1,148	5.2
Winter Range	174	58	76	292	695	791	2,086	3.9
Habitat Type	**Acres Indirectly Impacted (0.125 mile road buffer)**							
Severe Winter Range	4,099							65
Winter Conc. Area	15,983							72
Winter Range	30,855							58
Habitat Type	**Combined Direct and Indirect Acres Cumulatively Impacted**							
Severe Winter Range	4,699							74
Winter Conc. Area	17,131							78
Winter Range	32,941							62

A reduction in population size can also occur from many natural causes, but wildlife populations are only temporarily impacted by these losses and recover quickly if suitable habitat is present. In summary, mule deer numbers have been reduced in direct relationship to the direct loss of habitat within the cumulative impact assessment area. Secondarily, a reduction in habitat use—at some level—is expected to occur because of avoidance which represents an additional reduction in the carrying capacity of the analysis area. At what level these cumulative actions represent a significant level of impact is not certain at this time. However, the implementation of the proposed action will only exasperate the problem if mitigation is not undertaken to offset, at a minimum, the direct impacts associated with the OMDP. Using the methodology prescribed to the GSEO via the 1999 EIS (see **Wildlife Terrestrial**) and a buffer of 0.125 miles around all roads and pads within the GJFO, a total of 2,477 acres of habitat would be directly impacted by the proposed action.

Cumulative impacts to range allotments and wildlife are increasing regularly with the rapid expansion of residential and industrial land conversion and energy development. The mitigative actions identified in **Operator Committed Mitigation** and conditions of approval (Appendices C and F) will help to keep the direct, indirect, and cumulative impacts at a level which will not cause a significant impact to deer and elk populations within the cumulative analysis area.

PUBLIC COMMENTS AND RESPONSES

A Public Notice addressing the OMDP proposed action was published in the *Glenwood Post Independent* on December 21 and 28, 2007, and January 4, 2008, and in the *Grand Junction Sentinel* on December 24 and 31, 2007, and January 7, 2008, and in the *Rifle Citizen Telegram* on December 27, 2007, and January 3 and 10, 2008. An additional Public Notice of the proposed action was published in the same newspapers, as well as online at the BLM Grand Junction and Glenwood Springs Field Office websites on September 15, 2008, for a 15- day review.

Additionally, a letter containing the public notice information was mailed directly to multiple state and Federal agencies, including the U.S. Forest Service-Rifle Ranger District, Bureau of Reclamation, Colorado Oil and Gas Conservation Commission, Colorado Division of Wildlife, Garfield County, Mesa County, Town of De Beque, adjacent landowners, and BLM Grazing and Special Recreation Permittees (big-game outfitters). The 30-day public comment period closed on January 18, 2008.

In response to the scoping for comments identified in the Public Notice, BLM received comments from private citizens (three total: two in opposition and one in support) as well as the Bureau of Reclamation, Colorado Division of Wildlife, Center for Native Ecosystems, Colorado Mule Deer Association, Town of De Beque, Garfield County Road and Bridge Department, and Wilderness Workshop, for a total of ten responses. Written comments are summarized and responded to in Appendix G.

FUTURE IMPLEMENTATION ACTIONS USING STATUTORY CATEGORICAL EXCLUSIONS

Section 390 of the Energy Policy Act of 2005 established statutory categorical exclusions (SCEs) under the National Environmental Policy Act (NEPA) that apply to five categories of oil and gas exploration and development on Federal oil and gas leases. The purpose of these SCEs is to streamline the approval process for relatively minor actions in areas where environmental analysis had previously been conducted.

The SCEs apply to five categories of action:

- Individual surface disturbance of less than 5 acres so long as the total surface disturbance on the lease is not greater than 150 acres and site-specific analysis in a document pursuant to NEPA has been previously conducted.

- Drilling an oil or gas location or well pad at a site at which drilling has occurred within 5 years prior to the date of spudding the well.

- Drilling an oil or gas well within a developed field for which an approved land use plan or any environmental document prepared pursuant to NEPA analyzed drilling as a reasonably foreseeable activity, as long as such plan or document was approved within 5 years prior to the date of spudding the well.

- Placement of a pipeline in an approved right-of-way corridor, as long as the corridor was approved within 5 years prior to the date of placement of the pipeline.

- Maintenance of a minor activity, other than any construction or major renovation of a building or facility.

In reviewing an Application for Permit to Drill (APD), Surface Use Plan of Operations, or pipeline application involving a proposed activity that fits into one of the five categories, the appropriate SCE would be applied, and no further NEPA analysis would be required. However, a structured, interdisciplinary review and approval process, including onsite examinations of all proposed well and road locations and the application of appropriate mitigation and Best Management Practices (BMPs), would apply.

The use of these SCEs would allow EnCana to seek expedited approval of future actions that constitute minor alterations of the proposed OMDP (e.g., changes in pad configuration or location, minor changes in access routes, changes in the number of wells or pads, alterations in pipeline length or location, etc.). However, new implementation actions beyond the scope and intent of the SCEs would require addition environmental analysis prior to approval.

ORGANIZATIONS CONSULTED

The following organizations were consulted during the development of this EA:

- Bureau of Reclamation
- Colorado Division of Wildlife
- Colorado Mule Deer Association
- EnCana Oil & Gas (USA) Inc.
- Garfield County Board of County Commissioners
- Northern Ute Tribe
- Southern Ute Tribe
- Town of De Beque
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- Ute Mountain Ute Tribe
- Wasatch Surveying

LIST OF PREPARERS AND INTERDISCIPLINARY REVIEW

This EA was prepared by an interdisciplinary team of consulting resource specialists serving as a third-party NEPA contractor to the BLM. Jerry Powell of Wildlife Specialties, LLC, was the primary contractor; collaborating individuals with other firms are noted in Table 23. Resource management direction and final EA review was provided by BLM resource specialists as noted in Tables 24 and 25.

Table 23. List of Preparers.

Resource Parameter/Area of Responsibility	*Responsible Person*
Project Management	Jerry Powell
Socio-Economics, Transportation, Recreation	Jane Boand (David Evans and Assoc. Inc.)
Cultural Resources	Metcalf Archaeological Consultants, Inc.
Wastes, Hazardous or Solid	Michael Anderson (Summit Technical Resources)
Vegetation, Wetlands & Riparian Zones, Range Management, Invasive Non-Native Species, Special Status Species (plants), Soils	Rea Orthner (Western Ecological Resources, Inc.)
Air Quality, Cultural Resources, Environmental Justice, Migratory Birds, Water Quality, Noise, Paleontology, Realty Authorizations, Visual Resources, Wildlife Aquatic & Terrestrial,	Jerry Powell (Wildlife Specialties, LLC)
Geology and Minerals	Craig Carter (Carter Burgess Inc.)

Table 24. List of GJFO BLM Interdisciplinary Reviewers.

Resource Parameter/Area of Responsibility	*Responsible IDT Member*
CRITICAL ELEMENTS	
Air Quality	Matt Anderson
Cultural Resources	Aline LaForge
Environmental Justice	Matt Anderson
Invasive Non-Native Species	Mark Taber
Migratory Birds	Heidi Plank
Native American Religious Concerns	Aline LaForge
Special Status Species	Heidi Plank (wildlife), Anna Lincoln (plants)
Wastes, Hazardous or Solid	Alan Kraus
Water Quality, Surface and Ground	Min (Janny) Choy
Wetlands and Riparian Zones	Min (Janny) Choy
NON-CRITICAL ELEMENTS	
Access and Transportation	Jim Cooper
Fire and Fuels Management	Douglas Paul
Geology and Minerals	David (Scott) Gerwe
Paleontology	David (Scott) Gerwe
Range Management	Bob Fowler, Jim Dollerschell

Table 24. List of GJFO BLM Interdisciplinary Reviewers.	
Resource Parameter/Area of Responsibility	***Responsible IDT Member***
Realty Authorizations	Robin Lacy
Recreation	Kenneth Straley
Socio-economics	Matt Anderson
Soils	Julia Christiansen
Vegetation	Anna Lincoln, Bob Fowler
Visual Resources	Julia Christiansen
Wildlife, Aquatic	Heidi Plank
Wildlife, Terrestrial	Heidi Plank

Table 25. List of GSEO BLM Interdisciplinary Reviewers.	
Resource Parameter/Area of Responsibility	***Responsible IDT Member***
CRITICAL ELEMENTS	
Air Quality	Noel Ludwig
Cultural Resources	Cheryl Harrison
Environmental Justice	Jim Byers
Invasive Non-Native Species	Beth Brenneman
Migratory Birds	Jeff Cook
Native American Religious Concerns	Cheryl Harrison
Special Status Species	Jeff Cook (wildlife), Beth Brenneman (plants)
Wastes, Hazardous or Solid	Noel Ludwig
Water Quality, Surface and Ground	Noel Ludwig
Wetlands and Riparian Zones	Noel Ludwig
NON-CRITICAL ELEMENTS	
Access and Transportation	Jim Byers
Geology and Minerals	Karen Conrath
Noise	Noel Ludwig
Paleontology	Karen Conrath
Range Management	Isaac Pittman
Realty Authorizations	Jim Byers
Recreation	Jim Byers
Socio-economics	Jim Byers
Soils	Noel Ludwig
Vegetation	Beth Brenneman
Visual Resources	Kate Schwarzler
Wildlife, Aquatic	Jeff Cook
Wildlife, Terrestrial	Jeff Cook

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APPENDIX A

13-POINT SURFACE USE PLAN OF OPERATIONS SUBMITTED BY ENCANA OIL & GAS (USA) INC.

(Note to reader: permitted Conditions of Approval supersede any actions proposed herein)

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13-Point Surface Use Plan of Operations Submitted by EnCana

1. EXISTING ROADS

The proposed wellsite is staked and reference stakes are present as shown on attached Topo maps.
Access Roads – refer to Topo maps "A" and "B."
Access Roads within a one-mile radius – refer to Topo map "B."
The existing roads will be maintained in the same or better condition as existed prior to the commencement of operations and said maintenance will continue until final abandonment and reclamation of the well location. Excessive rutting or other surface disturbance will be avoided. Operations will be suspended temporarily during adverse weather conditions if excessive rutting is occurring when access routes are wet, soft, or partially frozen.

2. PLANNED ACCESS ROAD

All proposed access roads are shown on Topo map "B."

A. Width maximum – 30 feet overall right-of-way with an 18-foot road running surface, crowned and ditched and/or sloped and dipped.
B. Construction standard: The road will be constructed to meet the standards of the anticipated traffic flow and all weather requirements. Construction will include ditching, draining, crowning and capping or sloping and dipping the roadbed as necessary to provide a well-constructed and safe road.

   Prior to construction/upgrading the roadway will be cleared of any snow cover and allowed to dry completely.

   Traveling off of the thirty (30) foot right-of-way will not be allowed.

   Road drainage crossings will be of the typical dry creek drainage crossing type. Crossings will be neither designed so they will not cause siltation or the accumulation of debris in the drainage crossing nor will the drainages be blocked by the roadbed. Diverting water off at frequent intervals by means of cutouts will prevent erosion of the drainage ditches by runoff water.

   Upgrading will not be allowed during muddy conditions. Should mud holes develop, they will be filled in and detours around them avoided.

C. Maximum grade – the average grade will be 10% or less, wherever possible. The 10% grade will only be exceeded in areas where physical terrain or unusual circumstances require it.
D. Drainage design – the access road will be crowned and ditched or sloped and dipped, and water turnouts installed as necessary to provide proper drainage along the access road route.
E. Turnouts will be constructed along the access route as necessary or required to allow for the safe passage of traffic.
F. Culverts – none will be required unless otherwise specified during the onsite inspection.
G. Surface materials – surfacing materials will consist of native soil. If any additional surfacing materials are required they will be purchased from a local contractor having a permitted source of materials in the area. None are anticipated at this time.
H. Gates, cattle guards or fence cuts – none required unless specified during the onsite inspection.
I. Road maintenance – during both the drilling and production phase of operations, the road surface and shoulders will be kept in a safe and legal condition and will be maintained in accordance with the original construction standards. The access road right-of-way will be kept free of trash during operations.

J. The proposed access road has been centerline flagged.
K. Dust will be controlled on the roads and locations during construction and drilling by periodic watering of the roads and locations.

3. LOCATION OF EXISTING WELLS WITHIN A ONE MILE RADIUS

Please refer to Topo Map "C."

4. **LOCATION OF EXISTING AND/OR PROPOSED FACILITIES**

A. At each drill location, surface disturbance will be kept to a minimum. Each drill pad will be leveled using cut and fill construction techniques as noted in the attached survey.
B. Should drilling result in established commercial production the following will be shown:
   1. Proposed location and attendant lines, by flagging, if off well pad.
   2. Dimensions of facilities.
   3. Construction methods and materials.
   4. Protective measures and devices to protect livestock and wildlife.
   5. All buried pipelines will be buried to a depth of 3 feet, except at road crossing where they will buried to a depth of 4 feet.
   6. Construction width of the right-of-way/pipeline route will be restricted to 60 feet of disturbance.
   7. Pipeline location warning signs will be installed within 90 days after construction is completed.
   8. EnCana will condition pipeline right-of-ways in a manner to preclude vehicular travel upon said rights-of-way, except for access to pipeline drips and valves.
   9. Pipeline right-of-way will be requested on the APD. ROW request is for 60' for construction of working surface during construction. After construction is complete 30' is to be rehabilitated leaving a 30' working surface. In the event production is established this well will be tied-in to an existing pipeline as shown in Topo map "D".
   10. The area used to contain the proposed production facilities will be built using native materials. If these materials are not acceptable, arrangements will be made to acquire appropriate materials from private sources.
   11. A dike will be constructed completely around any production facilities which contain fluids (i.e. production tanks, produced water tanks, etc.). These dikes will be constructed of compacted subsoil, be impervious, hole 110% of the capacity of the largest tank, and be independent of the back cut.
   12. All permanent (onsite for six months or longer) above-the-ground constructed or installed, including pumping units, will be painted a flat non-reflective, earthtone color to match one of the standard environmental colors as determined by the Five-State Rocky Mountain Interagency committee. All production facilities will be painted within six months of installation. Facilities that are required to comply with Occupation Health and Safety Act Rules and Regulations will be excluded from this painting requirement.
   13. The production (emergency) pit will be 8 feet in diameter and 8 feet deep. It will be lined with corrugated steel with a steel mesh cover.
   14. If different production facilities are required, a sundry notice will be submitted.

C. EnCana Oil & Gas (USA) Inc. will protect all survey monuments, witness corners, reference monuments and bearing trees in the affected areas against disturbance during construction, operation, maintenance and termination of the facilities authorized herein.

EnCana Oil & Gas (USA) Inc. will immediately notify the authorized officer in the event that any corners, monuments or markers are disturbed or are anticipated to be disturbed. If any monuments, corner or accessories are destroyed, obliterated or damaged during construction,

operation or maintenance, EnCana will secure the services of a Registered Land Surveyor to restore the disturbed monuments, corner or accessories, at the same location, using surveying procedures found in the Manual of surveying Instructions for the Survey of the public Lands of the United States, latest edition. EnCana will ensure that the Registered Land Surveyor properly records the survey in compliance with the Colorado Revised Statues 38-53-101 through 38-53-112 (1973) and will send a copy to the authorized officer.

D. During drilling and subsequent operations, all equipment and vehicles will be confined to the access road right-of-way and any additional areas as specified in the approved Application for Permit to Drill.
E. Reclamation of disturbed areas no longer needed for operation will be accomplished by grading, leveling and seeding as recommended by the Bureau of Land Management.

EnCana Oil & Gas (USA) Inc. will be responsible for road maintenance from the beginning to completion of operations.

5. LOCATION AND TYPE OF WATER SUPPLY

A. Water to be used for the drilling of these wells will be hauled by truck over the roads described in item #1 and item #2, from the nearest water supply. Water volume used in drilling operation is dependent upon the depth of the well and any losses that might occur during drilling.

6. SOURCE OF CONSTRUCTION MATERIALS

A. All access roads crossing Federal land are described under Item #2, and shown on the OMDP Map.
All construction material for these location sites and access roads will be borrowed material accumulated during the construction of the location sites and access roads. No additional construction material from other sources is anticipated at this time. If in the future it is required, the appropriate actions will be taken to acquire it from private sources.

A. All trees on the locations, access road, and proposed pipeline routes will be disposed of by one of the following methods:
   1. Trees will be cut with a maximum stump height of six inches (6") and cut to 4-foot lengths and stacked off location. Trees will not be dozed off the location or access road, except on private surface where trees may be dozed. Trees may also be dozed on pipeline routes and then pulled back onto right-of-way as part of final reclamation.
   2. Limbs may be scattered off location, access road or along the pipeline, but not dozed off.

Rootballs will be buried or placed off location, access road, or pipeline route to be scattered back over the disturbed area as part of the final reclamation.

7. METHODS OF HANDLING WASTE MATERIALS

A. Cuttings.

a) If a closed-loop system is used, cuttings will be moved through a shaker system on the drill rig that captures drilling fluids from the cuttings. The cuttings are typically placed on the pad location within a containment berm until enough are collected to mix with Solibond to further dry and achieve a solid state. The solidified cuttings typically remain on the pad location and are spread on location during the interim reclamation phase of the pad when excavation equipment is used to reshape and contour the pad. If a drill rig with closed-loop system is not available when the proposed wells are scheduled for drilling, an open pit rig with an excavated reserve pit would be used to drill the wells. The drilling plan and survey

plats included in the APDs submitted to the BLM would specify the planned drilling system (closed-loop or open pit).

b) If a closed-loop system is not available and a reserve or production pit is required, it will be constructed on the existing location and will not be located in natural drainages where a flood hazard exists or surface runoff will destroy or damage the pit walls. All pits will be constructed so as not to leak, break, or allow the discharge of liquids there from.

B. Produced fluids – liquid hydrocarbons produced during completion operations will be placed in test tanks on the location. Produced wastewater will be confined to a lined pit (reserve pit) or storage tank for a period not to exceed ninety (90) days after initial production. During the permanent disposal method and location, along with the required water analysis will be submitted for the Authorized Officer's approval. Failure to file an application within the time frame allowed will be considered an incidence of noncompliance.
C. Sewage- self-contained, chemical toilets will be provided for human waste disposal. Upon completion of operations, or as needed, the toilet holding tanks will be pumped and the contents thereof disposed of in the nearest, approved, sewage disposal facility.
D. Garbage and other waste material – garbage, trash and other waste materials will be collected in a portable, self-contained and fully – enclosed trash cage during drilling and completion operations. Upon completion of operations (or as needed) the accumulated trash will be disposed of at an authorized sanitary landfill. No trash will be burned on location or placed in the reserve pit.
E. Immediately after removal of the drilling rig, all debris and other waste materials not contained in the trash cage will be cleaned up and removed from the well location. No adverse materials will be left on the location. Any open pits will be maintained until such time as the pits are backfilled.
F. Any spills of oil, gas, salt water or other potentially hazardous substances will be reported immediately to the BLM, and other responsible parties, and will be mitigated immediately, as appropriate, through clean up or removal to an approved disposal site.

8. ANCILLARY FACILITIES

Self-contained travel-type trailers may be used on site during drilling operations. Standard drilling operation equipment to be on location will include: drilling rig with associated equipment; living facilities for company representative, tool pusher, mud logger, directional driller; toilet facilities and trash containers.

Facilities other than those described in this surface use plan to support drilling operations will be submitted to the Authorized Officer via a sundry notice (form 3160-5) for approval prior to commencing operations.

9. WELLSITE LAYOUT

A. The attached location plat specifies the drill site layout as staked. Cross sections have been drafted to visualize the planned cuts and fills across the location. An average minimum of 6 inches of topsoil will be stripped from the location (including the areas of cut, fill and/or subsoil storage) and stockpiled for future reclamation of the well site. The stockpiled soil will be seeded within 48 of completion of the pad.
B. A production schematic showing the proposed production facility layout is attached.
C. The reserve pit and blooie pit will be constructed as a combination pit capable of holding approximately four times the TD hole volume. The pits were combined, as these are gas wells and there will be no danger of the accumulation of hydrocarbons that could result in a potential safety hazard. The blooie pit might be used for testing, but only after the drilling is completed and the drilling equipment and personnel are off the well site location. In the event that drilling fluid (mud) will have to be used then this pit will also serve as the reserve pit. The reserve pit will be lined to prevent seepage.

This requirement may be waived by the Bureau of Land Management upon receipt of additional information from EnCana Oil & Gas (USA) Inc. concerning the location of fresh water aquifers and potential flow rates, chemical analyses of waters from the aquifers, and information concerning both the mechanics and nature of the air mist drilling system including any additives used therein.

D. Prior to the commencement of drilling operations, the reserve pit will be fenced on three sides using three strands of barbed wire according to the following minimum standards:
   1. Corner posts will be cemented and/or braced in such a manner to keep the fence tight at all times.
   2. Standard steel, wood, or pipe posts will be used between the corner braces. The maximum distance between any two 2 posts will be no greater than 16 feet.
   3. All wire will be stretched using a stretching device before it is attached to the corner posts.

   The fourth side of the reserve pit will be fenced immediately upon removal of the drilling rig and the fencing will be maintained until the pit is backfilled.
E. Any hydrocarbons on the pit will be removed from the pit as soon as possible after drilling operations are completed.
F. Operator will notify the Authorized Officer at least three working days prior to construction of the well pad and/or related facilities and within two working days after completion of the well pad.

10. PLANS FOR RECLAMATION OF THE SURFACE:

The BLM will be contacted prior to commencement of any reclamation operations.

A. Production
   1. Immediately upon well completion, the well location and surrounding areas(s) will be cleared of all debris, materials, trash and junk not required for production.
   2. Immediately upon well completion, any hydrocarbons in the pit will be removed in accordance with 43CFR 3162.7-1.
   3. Before any dirt work to restore the location takes place, the reserve pit will be completely dry and all cans, barrels, pipe, etc. will be removed. Other waste and spoil materials will be disposed of immediately upon completion of drilling and workover activities.
   4. The reserve pit and that portion of the location and access road not needed for production facility/operations will be reclaimed within 90 days from the date of well completion, weather permitting.
   5. If the well is a producer, EnCana will upgrade and maintain access roads as necessary to prevent soil erosion, and accommodate year-round traffic. Areas unnecessary to operations will have areas reshaped. Topsoil will be redistributed and disked. All areas outside the work area will be re-seeded according to the Bureau of Land Management recommendations for seed mixture.
   6. If the well is abandoned or a dry hole, EnCana will restore the access road and location to approximately the original contours. During reclamation of the site, fill material will be pushed into cuts and up over the backslope. No depressions will be left that will trap water or form ponds. Topsoil will be distributed evenly over the location and seeded according to the recommended seed mixture. The access road and location will be ripped or disked prior to seeding. Perennial vegetation must be established. Additional work will be required in case of seeding failures, etc.

      Seedbed will be prepared by disking then roller packing following the natural contours. Seed will be drilled on contours at a depth no greater than 0.5 inch. In areas that cannot be drilled, seed will be broadcast at double the seeding rate and harrowed into soil. Certified seed will be used whenever available.

Fall seeding will completed after September 1, and prior to prolonged ground frost. To be effective, spring seeding will be completed after the frost has left the ground and prior to May 15.

7. Upon completion of backfilling, leveling and recontouring, the stockpiled topsoil will be evenly spread over the reclaimed areas(s). Prior to reseeding, all disturbed surfaces will be scarified and left with a rough surface. No depressions will be left that would trap water and form ponds. All disturbed surfaces will be re-seeded with a seed mixture to be recommended by the BLM.

   Seed will be drilled on the contour to approximately a depth of 0.5 inch. All seeding will be conducted after September 1 and prior to ground frost. Spring seeding will be done after the frost leaves the ground and no later than May 15. If the seeding is unsuccessful, EnCana may be required to make subsequent seedings.

B. DRY HOLE/ABANDONED LOCATIONS

A. On lands administered by the BLM, abandoned well sites, roads or other disturbed areas will be restored to near their original condition.
   This procedure will include:
   a. Reestablishing irrigation systems where applicable,
   b. Reestablishing soil conditions in irrigated field in such a way as to ensure cultivation and harvesting of crops and,
   c. Ensuring revegetation of the disturbed areas to the specification of the BLM at the time of abandonment.

B. All disturbed surfaces will be recontoured to the approximate natural contours and re-seeded according to BLM specifications. Reclamation of the well pad and access road will be performed as soon as practical after final abandonment and reseeding operations will be performed in the fall or spring following completion of reclamation operations.

11.SURFACE OWNERSHIP

Surface ownership may be either Fee or Federal and is noted on the APD.

12. OTHER INFORMATION

a. A Class III Cultural Resource Inventory of the proposed drill sites, access roads and other facilities on Federal lands has been conducted and a report filed with the appropriate BLM office.
b. If archaeological, historical or vertebrate fossil materials are discovered during the course of any construction activities, EnCana will suspend all operations that further disturb such materials and immediately contact the appropriate BLM office. Operations in the area of discovery will not resume until written authorization to proceed has been issued by the BLM Authorized Officer (AO).
c. EnCana will be fully responsible for the actions of their subcontractors. A copy of the approved APD and Conditions of Approval will be on location during drilling and completion operations.
d. Any construction activity in the areas will be done with awareness that many natural gas pipelines are buried. Some are apparent as to location; some have grown over with weeds and brush. It is suggested that the contractor contact the operators in the area to locate all lines before digging.

13. REPRESENTATIVES AND CERTIFICATION

A. Representative:
   RuthAnn Morss
   EnCana Oil & Gas (USA) Inc.

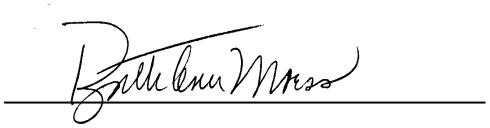
370 17th Street, Suite 1700
Denver, CO 80202
(720) 876-5060

All lease and/or unit operations will be conducted in such a manner that full compliance is made with all applicable laws, regulations, Onshore Oil and Gas Orders, the approved Plan of Operations, and any applicable Notice to Lessees.

The Operator will be fully responsible for the actions of its subcontractors. A complete copy of the approved Application for Permit to Drill will be furnished to the field representatives to ensure compliance and shall be on location during all construction and drilling operations.

B. Representative Certification:

I hereby certify that I, or persons under my supervision, have inspected the proposed drill site and access route, and I am familiar with the conditions that currently exist; that the statements made in this plan are, to the best of my knowledge, true and correct and the work associated with the operations proposed herein will be performed by the Operator, its contractors, and subcontractors conformity with this plan and the terms and conditions under which is approved. This statement is subject to the provisions of 18 U.S.C. 1001 for the filing of a false statement.



RuthAnn Morss
EnCana Oil & Gas (USA) Inc.
(720) 876-5060
January 22, 2007
(Revised December 12, 2007)

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APPENDIX B

10-Point Drilling Plan

SUBMITTED BY ENCANA OIL & GAS (USA) INC.

(Note to reader: permitted Conditions of Approval supersede any actions proposed herein)

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10-Point Drilling Plan Submitted By EnCana

All lease and/or unit operations will be conducted in such a manner that full compliance is made with applicable laws, regulations (43CFR3100), Onshore Oil and Gas Orders No. 1 and No. 2 and the approved Plan of Operations. The Operator is fully responsible for the actions of its subcontractors. A copy of the Conditions of Approval will be furnished to the field representatives to ensure compliance.

EnCana Oil & Gas (USA) Inc. will be operating under its Nationwide Bond # RLB0004733.

1. **Estimated Tops of Important Geologic Markers**
   a. Formations and depths will be submitted with the site-specific APD.

2. **Estimated Depths of Anticipated Water, Oil Gas or Mineral Formations**
   a. The proposed casing and cementing program has been designed to protect and/or isolate all usable water zones, potentially productive zones, lost circulation zones, abnormally pressured zones, and any prospectively valuable deposits of minerals. Any isolating medium other than cement will receive approval prior to use.

      The surface casing will be cemented back to surface either during the primary cement job or by remedial cementing.

3. **Pressure Control Equipment**
   a. Minimum working pressure on rams and BOPE will be 3,000 psi.
   b. Function test and visual inspection of the BOP will be conducted daily and noted in the IADC Daily Drilling Report.
   c. Both high and low pressure tests of the BOPE will be conducted.
   d. The Annular BOP will be pressure tested to a minimum of 50% of its rated working pressure.
   e. Blind and Pipe Rams/BOP will be tested to a minimum of 100% of rated working pressure (against a test plug)
   f. BOP testing procedures and testing frequency will conform to Onshore Order No. 2.
   g. BOP remote controls will be located on the rig floor at a location readily accessible to the driller. Master controls will be on the ground at the accumulator and will have the capability to function all preventers.
   h. The kill line will be 2” minimum and contain two kill line valves, one of which will be a check valve.
   i. The choke line will be 3” minimum and contain two choke line valves (3” minimum).
   j. The choke and manifold will contain two adjustable chokes.
   k. Hand wheels will be installed on all ram preventers.
   l. Safety valves and wrenches (with subs for all drill string connections) will be available on the rig floor at all times.
   m. Inside BOP or float sub will also be available on the rig floor at all times.
   n. Upper Kelly cock valve (with handle) will be available at all times.

Proposed BOP and Choke Manifold arrangements are attached.

4. Proposed Casing and Cementing Program

Casing	Depth	Hole Size	Size	Weight	Grade	Cement Volume
Conductor	0-40'	+/- 24"	16"	0.25" Wall	X42	+/- 5 yds ready mix (to surface)
Surface	Surface to 630' - 1500'	12 1/4"	8 5/8"	24#	J-55, STC All New	± 450 sks - ± 1060sks Class (G) 15.8ppg 1.17 feet^3/sx
Production Option #1	0' - 6300'	7-7/8"	5 ½"	17#	I-80, LTC All New	450 - 650 sx TXI 13.5 ppg 1.26 feet^3/sx
Production Option #2	0' – 6300'	7 7/8"	4 ½"	11.6#	I-80 LTC New	550 - 750 sx TXI 13.5 ppg 1.26 feet^3/sx

a. The specific casing setting depths will vary depending on well location and drilling conditions. The depths listed in the table give the approximate anticipated setting depth.
b. The contingency string will be in situations in which sever drilling conditions are encountered. Hazards such as severe lost circulation or hoe stability problems would warrant the use of a contingency string.
c. The proposed casing and cementing program will be conducted as approved to protect and/or isolate all usable water zones, potentially productive zones, lost circulation zones, abnormally pressured zones, and any prospectively valuable deposits of minerals. Any isolating medium other than cement will receive approval prior to use. The casing setting depth will be calculated to position the casing seat opposite a competent formation which will contain the maximum pressure to which it will be exposed during normal drilling operations. Determination of casing setting depth will be based on all relevant factors, including: presence/absence of hydrocarbons, fracture gradients, usable water zones, formation pressures, lost circulation zones, other minerals or other unusual characteristics.
d. All casing, except conductor casing, will be new or reconditioned and tested. Approval will be obtained from the Authorized Officer prior to using reconditioned casing. Used casing will meet or exceed API standards for new casing.
e. The surface casing will be cemented back to surface either during the primary cement job or by remedial cementing. Cement volumes based on 100% excess above annular volume; or as required based on field experience to ensure cement is circulated to surface. If drive pipe is used, it may be left in place its total length is less than twenty feet below the surface. If the total length of the drive pipe is equal to or greater than twenty feet, it will be pulled prior to cementing surface casing, or it will be cemented in place.
f. Surface casing will have centralizers on the bottom three joints, with a minimum of one centralizer per joint.
g. Top plugs will be used to reduce contamination of cement by displacement fluid. A bottom plug or other acceptable technique, such as a suitable pre-flush fluid, inner string cement method, etc. will be utilized to help isolate the cement from contamination by the mud being displaced ahead of the cement slurry.
h. All casing strings below the conductor will be pressure tested to 0.22 psi per foot of casing string length or to 1500 psi, whichever is greater, but not to exceed 70% of the minimum internal yield. If pressure declines more than 10% in 30 minutes, corrective action will be taken.
i. Casing design is subject to revision based on geologic conditions encountered.

5. Proposed Casing and Cementing Programs:

a. Surface casing @ 1500' MD; 8-5/8" 24# J-55 STC

Purpose: Protect willow fresh water and contain MASP to TD
Maximum anticipated mud weight at surface casing depth: = 9.0 ppg
Maximum anticipated mud weight at TD: = 9.0 ppg
Maximum anticipated equivalent formation pressure at TD = 7.7 ppg

Casing String				Casing Strength Properties			Minimum Design Factors		
Size	Weight (lb/feet)	Grade	Connection	Collapse (psi)	Burst (psi)	Tensile (1000 lb)	Collapse	Burst	Tension
8-5/8"	24	J/K-55	STC	1370	2950	244	1.00	1.10	1.50

Collapse Design:
Evacuated 8-5/8" 24# J-55casing with 9.0 ppg drilling fluid density:
Load = 9.0*0.052*1500' = 702 psig
Rating: = 1370
S.F. = 1.9

Burst Design: Assume kick with partially evacuated hole and an influx gradient of 0.22 psi/feet.
8-5/8" 24# J-55
MASP (Load) = 6300'*(0.4-0.22) psi/feet = 1134 psig
Rating: = 2950 psig
S.F. = 2.6

Tensile Design: Designed on Air Weight * Buoyancy + overpull margin
8-5/8" 24# J-55
Rating: = 372,000 lbs
Load: 1500'*24#*0.862+100,000 lbs (OPM) = 131,032 lbs
S.F. = 2.8

b. Production Casing @ 6300' MD; 4-1/2" 11.6# OR 5-1/2" 17# I-80, LTC

Maximum Anticipated Mud Weight at Total Depth = 9.0 ppg
Maximum Anticipated Equivalent Formation Pressure at Total Depth = 7.7 ppg
Maximum Surface Treating Pressure for Fracturing Operations = 7000 psig
Assumed Gas Gradient for Production Operations = 0.115 psi/feet

Casing String				Casing Strength Properties			Minimum Design Factors		
Size	Weight (lb/feet)	Grade	Connection	Collapse (psi)	Burst (psi)	Tensile (1000 lb)	Collapse	Burst	Tension
5-1/2"	17	I-80	LTC	6260	7740	348	1.00	1.10	1.3
4-1/2	11.6	I-80	LTC	6350	7780	212	1.00	1.10	1.3

Collapse Design: Designed on evacuated casing properties with 9.0 ppg drilling fluid density with no internal back-up.
5-1/2" 17# I-80 Weakest Collapse Resistance
5-1/2" 17# I-80 from 0' to 6300'
Load = 9.0*0.052*6300' = 2948 psig
Rating = 6260 psig
S.F. = 2.1

Burst Design: Assume maximum surface shut-in pressure during production, and maximum surface treating pressure during fracture stimulation operations.

5-1/2" 17# I-80 Weakest Burst (Internal Yield) Resistance
Design Consideration #1: Maximum Surface Shut-In Pressure
Design Point #1: 5-1/2" 17# I-80 from 0' to 6300'
MASSIP (Load) = 6300'*(0.40-0.115) psi/feet = 1795 psig
Rating = 7740 psig
S.F. = 4.3

Design Consideration #2: Maximum Surface Treating Pressure During Frac Operations
Design Point #1: 5-1/2" 17# I-80 from 0' to 6300'
MATP: = 7000 psig
Rating: = 7740 psig
S.F. = 1.1

Design Point #2: 5-1/2" 17# I-80 @ TD
Load: Frac grad – FW frac fluid:
(0.75-0.433) psi/feet*6300' = 1997 psig
Rating: = 7780 psig
S.F. = 3.8

Tensile Design: Designed on Air Weight * Buoyancy + overpull margin

Tensile design loads are a function of the casing weight; therefore, both varieties of casing are tested below.

Design Option #1 – 5-1/2" 17# I-80 LTC at surface
Load = (6300'*17 lb/feet*0.862) +100,000 lbs (OPM) = 192,320lbs
Rating = 348,000 lbs
S.F. = 1.8

Design Option #2 – 4-1/2" 11.6# I-80 LTC at surface
Load = (6300'*11.6 lb/feet*0.862) +100,000 lbs (OPM) = 162,994 lbs
Rating = 212,000 lbs
S.F. = 1.3

*Cementing Volume Design Clarification:
Surface Casing @ 630' to 1500':
*Cement designed to cover the entire string with 100% excess.
Production Casing
*Designed to 200' above top of Mesaverde/Ohio Creek formation. Volume assumes 7-7/8" gauge hole diameter plus 30%.
*If open-hole logs are run, cement volumes will be determined from the caliper plus 10% excess.

6. Directional Drilling Program
An S-shaped directional design will be used to reach the targeted bottomhole locations. In general, a target radius of 200' will be used. Specific directional plans for each well will be included with the APD.

7. Proposed Drilling Fluids Program

DEPTH	*MUD TYPE*	*DENSITY Lb/gal*	*VISCOSITY (sec/qt)*	*FLUID LOSS (cc)*
0' – 1500'	Fresh Water Gel	8.4 - 9.0	28 – 35	NC
1500' – TD	LSND	8.8 – 9.0	35 – 45	5 - 15 cc

a. The drilling fluids have been designed for optimal wellbore hydraulics and hole stability. Mud flow and volume will be monitored both visually and with electronic pit volume totalizers.

Proposed Alternative Drilling Fluids Program

In the event that geological conditions permit, an unconventional drilling system may be utilized. Fluids in the system include, but are not limited to, air/nitrogen, mist, foam, and aerated muds. Below listed are three unconventional fluid options and physical characteristics.

DEPTH	*MUD TYPE*	*DENSITY lbs/gal*	*VISCOSTIY (Equivalent YP)*	*FLUID LOSS (cc)*
1500' - TD	Air/N2, Mist	<0.5	5	N/A
1500' - TD	Foam	0.5 – 4	20	<5
1500' - TD	Aerated Mud	4-8	8-25	5-10

8. Testing, Coring and Logging

a. Drill Stem Testing – none anticipated
b. Coring – As deemed necessary by geology
c. Mud Logging – Optional
d. Logging:

Open Hole	Logging Interval
PEX (Optional)	AIT-GR-Neutron/Litho-Density From TD to surface casing

Cased Hole	Logging interval
CBL/CCL/GR/VDL	As needed for perforating control
RST	In lieu of PEX

9. Air/Mist Drilling

The following equipment will be in place and operational during air/gas drilling:

- Properly lubricated and maintained rotating head
- Spark arrestor on engines or water cooled exhaust
- Blooie line discharge 100 feet from well bore and securely anchored
- Straight run on blooie line
- Deduster equipment
- All cuttings and circulating medium will be directed into a reserve or blooie pit
- Float valve above bit
- Automatic igniter or continuous pilot light on the blooie line
- Compressors will be located in the opposite direction from the blooie line a minimum of 100 feet from the wellbore
- Mud circulating equipment, water, and mud materials sufficient to maintain the capacity of the hole and circulating tanks or pits

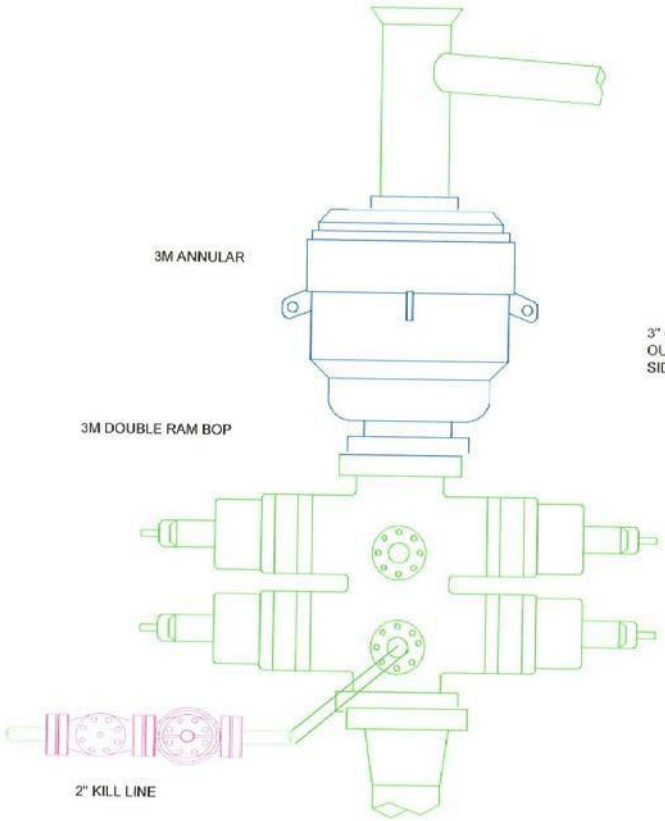
10. Abnormal Pressures or Temperature

a. This area is known to be underpressured. Lost circulation has been experienced in offset wells. Barite and a selection of "sized" lost circulation materials will be kept on location during drilling operations.

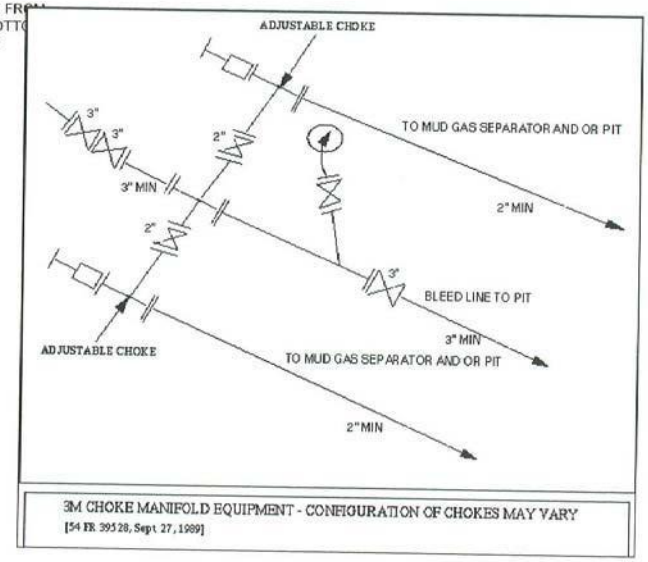
The anticipated bottomhole pressure is 6300*0.40 psi/feet = 2520 psi
The maximum anticipated surface pressure is 6300*(0.4-0.22) psi/feet = 1134 psi
b. No hydrogen sulfide has been encountered or is known to exist from previous drilling in the area at this depth.

11. Anticipated Start Date and Duration of Operations

Drilling operations are expected to require ± 12 days on each well. Completion operations are anticipated to begin within 15 days of finishing the drilling portion of the last well on each pad. Completion operations will require approximately 30 days.



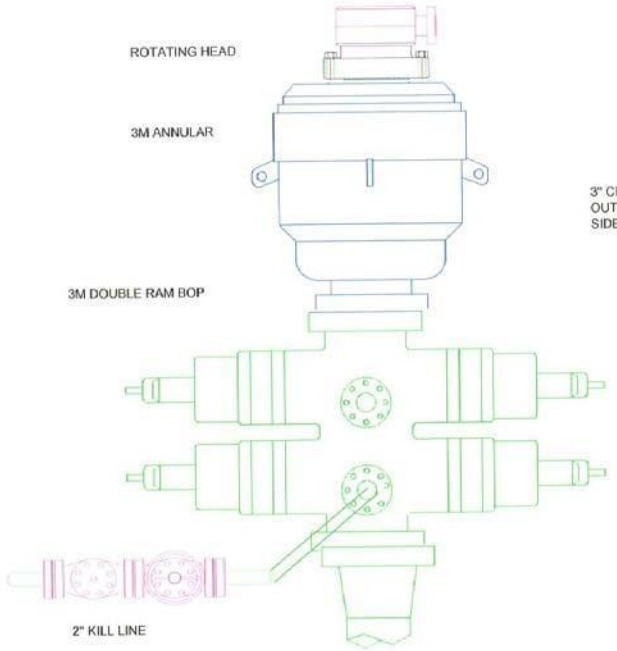
3" CHOKE LINE FR
OUTLET ON BOTT
SIDE OF RAMS



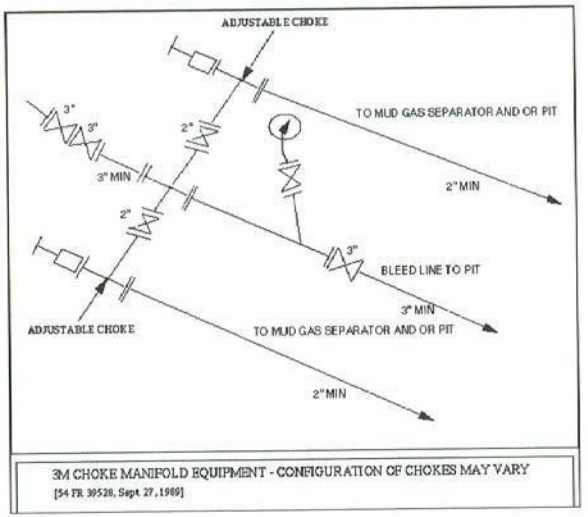
3M CHOKE MANIFOLD EQUIPMENT - CONFIGURATION OF CHOKES MAY VARY
[54 FR 39528, Sept. 27, 1989]

3M BOP.xls

ATTACHMENT A



3" CHOKE LINE FROM OUTLET ON BOTTOM SIDE OF RAMS



3M CHOKE MANIFOLD EQUIPMENT - CONFIGURATION OF CHOKES MAY VARY
[54 FR 39528, Sept 27, 1989]

3M BOP w Rot Head.xls

ATTACHMENT B

APPENDIX C

OMDP SURFACE OWNERSHIP MAP

AND

OMDP MINERAL OWNERSHIP MAP

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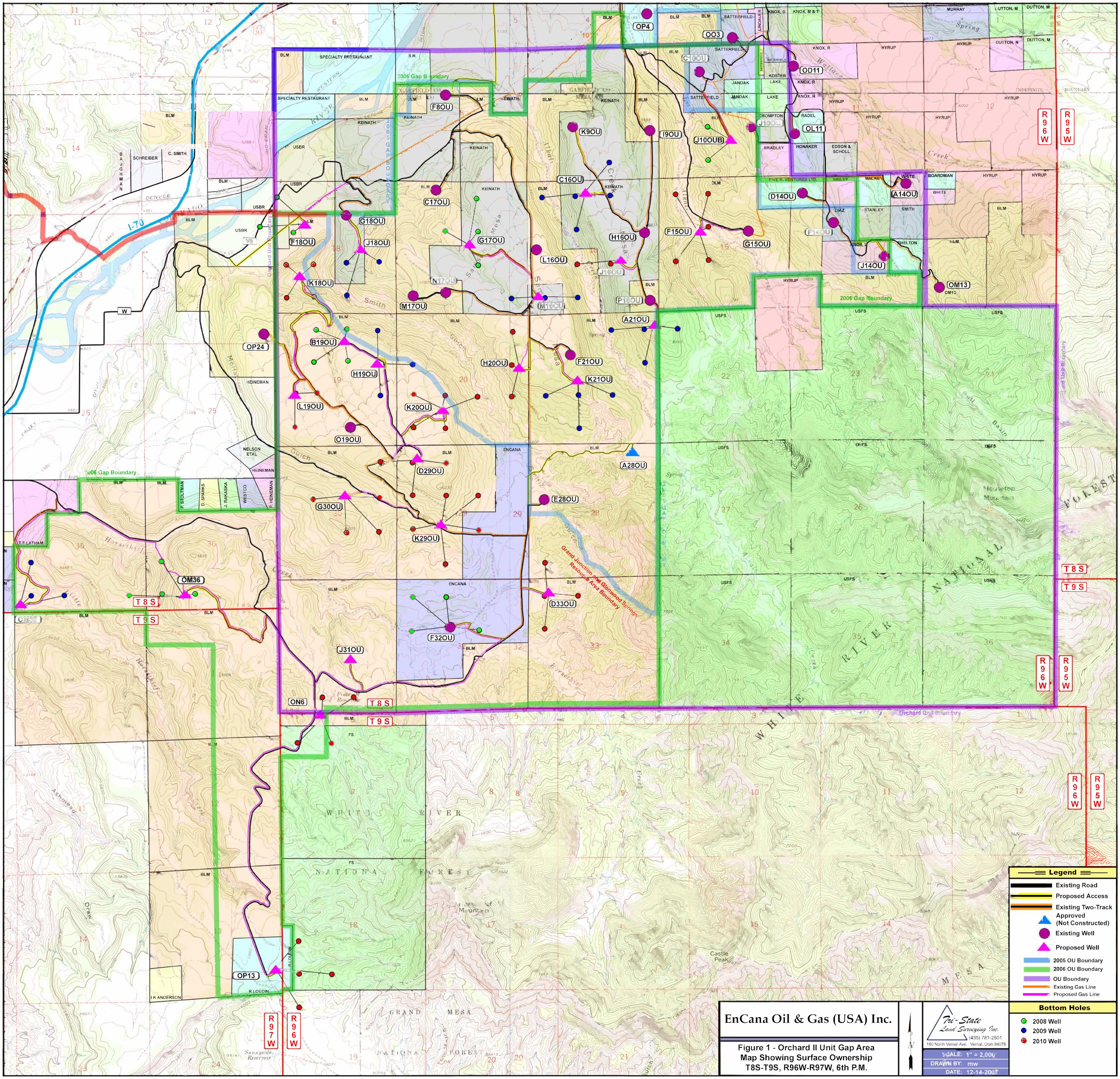
2006 Gap Boundary
2005 GAP BOUNDARY
Orchard Unit Boundary
Grand Junction and Glenwood Springs Resource Area Boundary
I-70
WHITE RIVER NATIONAL FOREST
GRAND MESA
Castle Peak
Sunnyside Reservoir
Piute Reservoir
T 8 S
T 9 S
R 96 W
R 95 W
R 97 W
SPECIALTY RESTAURANT
BLM
USBR
USFS
FS
KEINATH
ENCANA
HYRUP
SATTERFIELD
KNOX, R
JANDAK
LAKE
CROMPTON
RADEL
BRADLEY
HONAKER
EDSON & SCHOLL
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MACKEY
WHITE
BOARDMAN
STANLEY
SMITH
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CHELTON
MURRAY
DUTTON, M
DUTTON, N
KNOX, M & T
KNOX, D
LINDAUER
KOSTER
HEINEMAN
NELSON ETAL
P. STOLTMAN
D. SPARKS
J. RAKASKA
WESTCO
P. HEINEMAN
T.F. LATHAM
R LOUDIN
I K ANDERSON
SCHREIBER
C. SMITH
BAUGHMAN
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OO3
C10OU
OD11
F8OU
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I9OU
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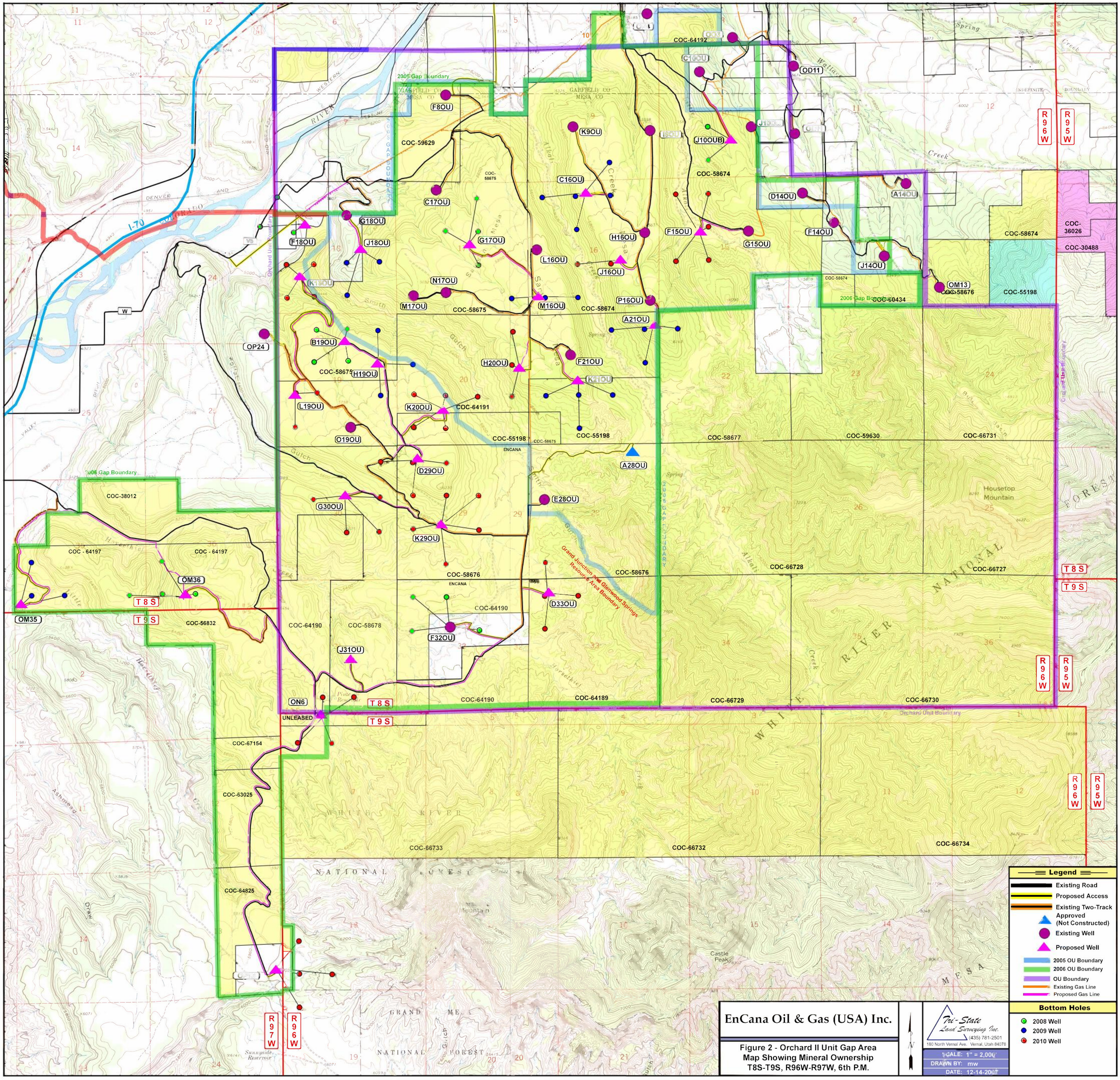
A28OU
D29OU
E28OU
G30OU
K29OU
OM36
OM35
D33OU
F32OU
J31OU
ON6
OP13
Legend
Existing Road
Proposed Access
Existing Two-Track
Approved (Not Constructed)
Existing Well
Proposed Well
2005 OU Boundary
2006 OU Boundary
OU Boundary
Existing Gas Line
Proposed Gas Line
Bottom Holes
2008 Well
2009 Well
2010 Well
Tri-State Land Surveying Inc.
(435) 781-2501
180 North Vernal Ave. Vernal, Utah 84078
SCALE: 1" = 2,000'
DRAWN BY: mw
DATE: 12-14-2007

EnCana Oil & Gas (USA) Inc.

Figure 1 - Orchard II Unit Gap Area Map Showing Surface Ownership T8S-T9S, R96W-R97W, 6th P.M.


2005 Gap Boundary
2006 Gap Boundary
Orchard Unit Boundary
Grand Junction and Glenwood Springs Resource Area Boundary
COC-64192
COC-59629
COC-58674
COC-58675
COC-58676
COC-58677
COC-58678
COC-59630
COC-66731
COC-60434
COC-36026
COC-30488
COC-55198
COC-64191
COC-64190
COC-64189
COC-66728
COC-66727
COC-66729
COC-66730
COC-66733
COC-66732
COC-66734
COC-38012
COC - 64197
COC-56832
COC-67154
COC-63025
COC-64825
UNLEASED
ENCANA
C10OU
OD11
J10OUB
K9OU
C16OU
C17OU
F8OU
G18OU
F18OU
J18OU
K18OU
G17OU
L16OU
H16OU
J16OU
N17OU
M17OU
M16OU
P16OU
F15OU
G15OU
D14OU
A14OU
F14OU
J14OU
OM13
A21OU
F21OU
K21OU
H20OU
K20OU
L19OU
B19OU
H19OU
O19OU
OP24
D29OU
G30OU
K29OU
A28OU
E28OU
D33OU
F32OU
J31OU
OM36
OM35
ON6
T 8 S
T 9 S
R 96 W
R 95 W
R 97 W
I-70
COLORADO
RIVER
WHITE RIVER
NATIONAL FOREST
Housetop Mountain
Castle Peak
GRAND MESA
Sunnyside Reservoir
Legend
Existing Road
Proposed Access
Existing Two-Track
Approved (Not Constructed)
Existing Well
Proposed Well
2005 OU Boundary
2006 OU Boundary
OU Boundary
Existing Gas Line
Proposed Gas Line
Bottom Holes
2008 Well
2009 Well
2010 Well
EnCana Oil & Gas (USA) Inc.
Figure 2 - Orchard II Unit Gap Area
Map Showing Mineral Ownership
T8S-T9S, R96W-R97W, 6th P.M.
N
Tri-State Land Surveying Inc.
(435) 781-2501
180 North Vernal Ave. Vernal, Utah 84078
SCALE: 1" = 2,000'
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APPENDIX D

STANDARD CONDITIONS OF APPROVAL

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Standard Surface Use Conditions of Approval
Grand Junction Field Office

Applicable to All Activities within the Orchard Master Development Plan

NOTIFICATION REQUIREMENTS

The following standard surface use COAs apply in addition to all stipulations attached to the respective Federal leases and in addition to any site-specific COAs for individual well pads, pipelines, and roads. When wording or numbering of these COAs differs from those included in the OMDP, the following COAs supersede other versions.

1. Administrative Notification:
At least 48 hours prior to construction, the operator shall notify the BLM representative of construction startup plans.

2. Other Permits:
This authorization is contingent upon receipt of and compliance with all appropriate Federal, state, county and local, permits. The operator shall be responsible for obtaining all necessary environmental clearances and permits from all agencies (U.S. Army Corps of Engineers, Colorado Division of Wildlife, U.S. Fish & Wildlife, U.S. Forest Service, Colorado Department of Transportation, Colorado Department of Health & Environment, County Health Department, etc.) before commencing any work under this permit. Without all clearances and permits, this permit shall be not in effect. Operator shall assume all responsibility and liability related to potential environmental hazards encountered in connection with work under this permit.

3. Stormwater:
The operator will consult with the State of Colorado Water Quality Control Division (contact Matt Czahor at: 303-692-3575 or matthew.czahor@state.co.us) regarding Stormwater Discharge Permits, prior to commencing construction activities. All construction activities that disturb one acre or greater require a Stormwater Discharge Permit. Certification to the BLM, including permit certification number, is required prior to the start of construction. Compliance with the permit requires pre-construction preparation and completion of a Stormwater Management Plan for positive, directed run-off and sediment management and implementation of site-specific adaptive Best Management Practices (BMPs) and systematic monitoring and maintenance and reporting. BMPs may include run-on/run-off controls such as ditches or berms, basins, straw wattles, or other erosion and sediment control methods, to reduce potential erosion and sediment production and transport.

4. Existing Uses:
The operator shall obtain agreements allowing construction with all existing rights-of-way holders, authorized users and pipeline operators, prior to surface disturbance or construction of the location or access across or adjacent to any existing or approved rights-of-way or pipelines. In the case of privately-owned surface, the operator shall certify to BLM that a Surface Use Agreement has been reached with the private surface owners, prior to commencing construction. If an Agreement cannot be reached, the operator shall comply with provisions of the law or regulations governing the Federal right of re-entry to the surface (43 CFR 3814).

5. Fire:
The operator shall be responsible for the prevention and suppression of fires on public lands, if caused by

its employees, contractors, or subcontractors. Range or forest fires will be immediately reported to the BLM Field Office. All other fires or explosions that cause damage to property, equipment, loss of oil or gas, or result in injuries to personnel will be reported to the BLM Authorized Officer. During conditions of extreme fire danger, surface use operations may be either limited or suspended in specific areas, or additional measures may be required by the BLM.

6. Road Construction and Maintenance:
To control erosion and sediment transport, roads shall be crowned or sloped, ditched, surfaced, drained with culverts and/or water dips, and constructed to BLM Gold Book standards. Culvert outlets shall incorporate controls such as rip-rap, sediment catchments, and anchored straw bales, to slow water velocity and prevent erosion and soil transport. Initial gravel application shall be a minimum of 4 inches.

The operator shall provide timely year-round road maintenance and cleanup on the roads. A regular schedule for maintenance shall include, but not be limited to, crown or slope reconstruction, blading, ditch, culvert and catchment cleaning, road surface replacement, and dust abatement. When rutting within the traveled way becomes greater than 6 inches, blading, and/or gravelling shall be conducted as approved by the authorized officer.

7. Pipelines:
Pipelines shall be buried to a minimum depth of 48 inches in the roadway and at road crossings, 36 inches through typical soil and rock, and 24 inches in areas requiring rock blasting. The holder is responsible to bury pipe to a depth which safely accommodates existing land and road uses and maintenance.

8. Dust Abatement:
The operator shall implement dust abatement measures as needed to prevent fugitive dust from vehicular traffic, equipment operations, or wind events. The BLM may direct the operator to change the level and type of treatment (watering or application of various dust agents, surfactants, and road surfacing material) if dust abatement measures are observed to be insufficient.

9. Drainage Crossings and Culverts:
Within 100 feet of stream channels, erosion protection and silt retention techniques, including construction of silt catchment dams, installation of culverts or drainage dips, placement of surface rock on approaches to stream crossings, placement of surface rock, straw bales, and/or matting will be used along proposed road reaches.

In areas within 100 feet of an intermittent drainage, an adequate vegetative buffer, artificial buffer, (e.g., straw bales, matting, etc.), or filter strip will be maintained between the road and the drainage, to minimize sediment transport into the drainage.

Construction activities at perennial, intermittent, and ephemeral drainage crossings (e.g., burying pipelines, installing culverts) shall be timed to avoid high flow conditions and shall consist of either a piped stream diversion or the use of a coffer dam and pump to divert flow around the disturbed area.

Pipelines installed beneath stream crossings shall be buried to a minimum depth of 4 feet below the channel substrate, to avoid exposure by channel scour and degradation. Following burial, the channel grade and substrate composition shall be returned to pre-construction conditions.

Culverts at drainage crossings shall be designed and installed to pass a 25-year or greater storm event, but due to the flashy nature of area drainages and anticipated culvert maintenance, the U.S. Army Corps of Engineers recommends designing drainage crossings for the 100-year event. On perennial and

intermittent streams, culverts shall be designed to allow for passage of aquatic biota. The minimum culvert diameter in any installation for a drainage crossing or road drainage shall be 18 inches. Crossings of drainages deemed to be jurisdictional waters of the U.S. pursuant to Section 404 of the Clean Water Act may require additional culvert design capacity.

10. Jurisdictional Waters of the U.S.:
Within The operator shall obtain appropriate permits from the U.S. Army Corps of Engineers prior to discharging fill material into waters of the U.S. in accordance with Section 404 of the Clean Water Act. Waters of the U.S. are defined in 33 CFR Section 328.3 and may include wetlands as well as perennial, intermittent, and ephemeral streams. Permanent impacts to waters of the U.S. may require mitigation. Contact Sue Nall, U.S. Army Corps of Engineers, at 970-243-1199 x16 or at susan.nall@usace.army.mil.

11. Wetlands and Riparian Zones:
The operator shall restore temporarily disturbed wetlands or riparian areas. The operator shall consult with the BLM to determine appropriate mitigation, including verification of native plant species to be used in restoration. Contact Janny Choy at the Grand Junction Field Office at 970-244-3013 (min_choy@blm.gov).

12. Pre-Construction and Limit of Disturbance:
Snow fence or flagging shall be installed to mark boundaries of permitted area of disturbance. Slope, grade, and other construction control stakes shall be placed, as necessary, to ensure construction in accordance with the Surface Use Plan. Cut/ fill slopes and spoil storage areas shall be marked with stakes and/or lath at 25 foot intervals. The tops of the stakes or laths shall be painted or flagged in a distinctive color. All boundary markers shall be maintained in place until final construction cleanup is completed. If stakes are disturbed, they shall be replaced before construction proceeds.

13. Vegetation Removal:
New surface disturbance, especially vegetation removal, shall not be allowed between May 15 and July 15, to prevent potential taking of migratory birds and/or eggs, unless otherwise approved in writing by the BLM Authorized Officer. If surface disturbance is proposed during this period, a migratory bird survey shall be required and submitted with a written request for exception, prior to any surface disturbance. If vegetation removal is accomplished prior to May 15, exception may be granted to allow work on the project during the closure period.

A. Prior to any construction or placement of drilling facilities, the location and access road shall be cleared of brush and trees:

    1. All material four or more inches in diameter shall be chipped or shredded in place, to be salvaged and stored with topsoil. No stump over six inches in height shall be left in place.

    OR

    2. Material four inches in diameter or greater shall be cut down and removed from public land. A woodcutting permit from BLM may be required prior to clearing. Slash smaller than 4 inches shall be chipped or scattered and then salvaged with topsoil. No stump over six inches in height shall be left in place. Stumps may be buried or scattered in areas designated by the BLM, such as a toe slope or pipeline. To avoid infestation of pinyon pines by the Ips beetle, any pinyon trees damaged during road, pad, or pipeline construction shall be chipped after being severed from the stump or grubbed from the

ground, or cut and removed from the site within 24 hours to a location approved by the Colorado State Forest Service.

B. To help provide visual screening, and minimize impacts on wildlife, all trees directly outside the staked perimeter of construction will remain undamaged and left standing, except if other removal is specifically directed by the BLM in order to mitigate straight-line visual effects of cut slopes or cleared vegetation.

14. Topsoil Stripping, Storage, and Replacement:
When saturated soil conditions exist on access roads or location, construction shall be halted until soil material dries out or is frozen sufficiently for construction to proceed without undue damage and erosion to soils, roads, and locations.

Topsoil shall be stripped following removal of vegetation during construction of well pads, pipelines, roads, or other surface facilities. This shall include all growth medium - at a minimum, the upper 2-6 inches of soil - but shall also include stripping of any additional topsoil present at a site, such as indicated by color or texture. Stripping depth may be specified during the onsite inspection. Stripped topsoil shall be stored separately from subsoil or other excavated material and replaced prior to interim seedbed preparation. No topsoil shall be stripped when soils are moisture-saturated or frozen below the stripping depth.

15. Drilling:
Hazardous substances specifically listed as a hazardous waste or demonstrating a character of a hazardous waste (see 40 CFR 261) will not be used in drilling, testing, or completion operations, nor introduced at any time into the reserve or cuttings pit.

Fluids shall be confined to pits during flaring or fracing. A flare or blooey line shall be directed into a pit and against a bank to prevent materials from leaving the pit. Fluids shall also be kept in pits or tanks during the fracing process. During air drilling, the blooey line must be misted.

All pits that may contain liquid material shall be lined to prevent seepage into the ground. To prevent seepage into the ground, the reserve pit liner must remain intact and in good working condition, with no tears or holes, until reserve pit is backfilled.

The reserve or cuttings pit shall be constructed in a manner which precludes the accumulation of surface precipitation runoff into the pit and maintains at all times 2 feet of freeboard between the maximum fluid level and the lowest point of containment. In the event that downhole operations threaten to exceed the required 2-foot freeboard regarding reserve pit fluids, immediate notification shall be provided to the BLM, and immediate steps shall be taken to prevent the introduction of additional fluids until fluid removal or alternative containment methods can be approved.

Reserve or cuttings pit shall be fenced on three sides prior to drilling activity and closed off on the fourth side after drilling is finished. Fencing for pits and other facilities with potential to cause harm to livestock, big game and other wildlife shall be 8-foot woven wire fence with adequate bracing. The bottom 2 feet of mesh shall be sized adequately to preclude small animals from entering the pit. The fence construction shall be on cut or undisturbed ground and the fence shall be maintained in a livestock tight condition (Fencing: BLM Manual Handbook H-1741-1, p. 16).

If any reserve, evaporation, or holding pit is constructed with a side slope steeper than 3:1, or if the pit is lined, escape ramps designed to allow all animals to escape the pit shall be installed every 50 feet along the reserve pit slope and at each corner. An acceptable escape ramp would be an anchored section of

galvanized chain-link fence at least 24 inches wide which extends from the bottom of the pit to the top of the pit slope and across the top edge of the pit liner.

The reserve pit shall be dry prior to backfilling. Before backfilling, reserve pit liner shall be cut off as close to the bottom of the pit as possible or removed and disposed of properly. At the time of backfilling, all muds and associated solids shall be confined to the pit. None shall be squeezed out or incorporated into surface materials. A minimum of 4 feet of cover (overburden) is required; when work is complete, the pit area must support the weight of heavy equipment without subsidence.

16. Deadlines for Temporary Seeding and Interim Reclamation:
Topsoil storage piles, stormwater control features, and cut-and-fill slopes shall undergo temporary seeding within 30 days following completion of pad construction, to stabilize the materials, maintain biotic soil activities, and minimize weed infestations.

Interim reclamation, to reduce a well pad to the size needed for production, shall be completed within 6 months following completion of the last well planned for the pad or after a year has passed with no new wells drilled. Deadlines are subject to extension, on a case-by-case basis, following application in writing to the BLM.

17. Production:

A. Production facilities shall be located and arranged to facilitate safety and minimize long-term surface disturbance, e.g., located at the access road end of the pad, with tanks in cut. As practical, access to production facilities should be provided by a teardrop-shaped road through the production area, so that the center may be revegetated.

B. All installed production facilities, (e.g., storage tanks, load-outs, or separation/ treating units,) that have the potential to leak or spill oil, condensate, produced water, glycol, or other fluid which may constitute a hazard to public health or safety shall be placed within appropriate secondary containment structures. Structures may consist of dikes, walls, drip pans or other construction which is installed so that no spill or leakage can drain, infiltrate, or otherwise escape to ground water, surface water, or navigable waters before discovery and cleanup. A structure shall hold 110% of the capacity the largest single tank it contains and be impervious to any oil, glycol, produced water, or other toxic fluid for 72 hours.

C. Chemical containers shall be clearly labeled, maintained in good condition, and placed within secondary containment, for protection against spill or puncture. They shall not be stored on bare ground, nor exposed to sun and moisture.

D. To blend with the natural environment, all permanent above-ground facilities placed on the location shall be painted BLM Standard Environmental Color Shale Green, in a non-reflective finish.

18. Recontouring and Reclamation:
Prior to reclamation or abandonment of the well pad or access road, an inspection of the disturbed area shall be held to review the existing reclamation plan or agree to an updated plan.
Reclamation will be considered successful when the site is protected from erosion and revegetated with a self-sustaining, vigorous, diverse, native (or otherwise approved) plant community that minimizes loss of habitat, visual resources, and forage.

A. Interim Reclamation: When the well goes into production, areas unnecessary to operation shall be reshaped to blend with natural topography to the extent possible.
   1. Should the well produce, mandatory interim reclamation shall be completed, using the seed mix and techniques specified by the BLM.
   2. Areas unnecessary to operation shall be reshaped to blend with natural topography to the

extent possible.

3. Remove trash and equipment unnecessary to production operations.
    a. Final Reclamation: If well is abandoned/ dry hole, reclamation shall be final.
        1. Remove all equipment, facilities, and trash from the location.
        2. Plug, cap, and remove related surface equipment from each borehole.
        3. Purge and plug subsurface pipelines at specified intervals.
        4. Reclaim the site as soon as possible after the well is plugged and abandoned. Complete earthwork and seeding within one year from plugging and abandonment.
        5. Dry hole marker shall be sub-surface, to prevent raptor predation upon small game, including sage-grouse.
        6. Strip topsoil and vegetation (excluding whole brush and trees) and stockpile separately on the location.
        7. Proceed with recontouring and seedbed preparation as specified.

B. Recontouring and Seedbed Preparation (Interim or Final Reclamation)
    1. For compacted areas, initial recontouring and seedbed preparation shall include ripping to a minimum depth of 18 to 24 inches, with a furrow spacing of 18 to 24 inches. Where possible, rip in two passes at perpendicular directions.
    2. After breaking up compaction, reshape contours to blend with natural topography to the extent possible. Push fill material into cuts and up over the backslope of the cuts, leaving no depressions where water could pond.
    3. Following contouring, cover backfilled or ripped surfaces evenly with salvaged topsoil.
    4. Final seedbed preparation shall consist of scarifying (pitting, raking or harrowing) the spread topsoil prior to seeding. If the area is to be broadcast-seeded or hydro-seeded, or if more than one season has elapsed since final seedbed preparation, scarification shall be repeated no more than 24 hours before prior to seeding to break up any crust that has formed.
    5. To create a more natural looking landscape in areas of visual sensitivity, or to control erosion and enhance vegetative establishment on slopes steeper than 3:1, seedbed preparation shall consist of pocking or pitting. Surface soil material shall be completely and uniformly pocked or pitted with small depressions, to form micro-basins scaled to site and materials. Depressions shall be constructed in rows, in a "fish scale" pattern. This pattern shall be constructed perpendicular to the natural flow of water down a slope and/or to prevailing winds.
    6. Seedbed prep is not generally required for topsoil storage piles or other areas of temporary seeding.

C. Seeding: Perennial vegetation must be established and additional work shall be required in cases of failure.
    a. Interim Reclamation: Seed all disturbed areas outside the production area, according to specified methods and seed mixture.
    b. Final Reclamation: Seed all recontoured and disturbed areas, according to specified methods and seed mixture.
    c. Hydroseeding and hydro-mulching may be used in areas of temporary seeding or in areas where drill-seeding or broadcast-seeding/raking are impractical. Hydro-seeding and hydro-mulching must be conducted in two separate applications to ensure adequate seed-to-soil contact.
    4. All disturbed areas shall be seeded with the specified mixture, certified to be weed-free. Application rates are for Pure Live Seed (PLS). To maintain quality, purity, germination, and yield, only tested, certified seed for the current year, with a minimum germination

rate of 80% and a minimum purity of 90% shall be used. Seed shall be viability-tested in accordance with State law(s) and within 9 months prior to purchase.

5. Seed tags or other official documentation shall be submitted to the BLM for pre-approval at least 14 days before the date of proposed seeding. Within 30 days of seeding, weed-free certification, seed tags and a Sundry Notice of Subsequent Report describing the completed work shall be submitted to the Field Manager.
6. Prepare seedbed as described above, to include soil roughening, scarifying, contour cultivating, or pitting.
   a. Drill seed ½ inch deep, following the contour of the site. Follow drill seeding with cultipaction to enhance seed-to-soil contact and prevent losses of both. Mulch shall be applied and crimped into the soil within 24 hours of drill seeding.
   b. Broadcast seeding must occur within 24 hours of seedbed preparation, or harrowing is necessary to establish seed-to-soil contact. If 24 hours have passed since broadcast seeding, cover all seed ½ to 1 inch deep with a rake or harrow.
   c. Requests to use soil amendments, including basic product information, must be submitted to the BLM for approval.
   d. Note that temporary seeding allows use of a seed mix containing sterile hybrid non-native species or approved cover crop, in addition to native perennial species.
   e. On private land, BLM recommended seed mixes are recommended, but the surface landowner has ultimate authority over the seed mix to be used in reclamation, provided that it contains no State or County noxious, prohibited, or restricted weed seeds and that it contains no more than 0.5 percent by weight of other weed seeds.
   f. Complete all recontouring and seeding after September 15, and before frost date, in the first autumn season following completion of the last well planned for the pad, or if more than a year has passed since the completion of a well on the pad.
   g. If interim revegetation is unsuccessful, additional prep and reseeding shall be completed annually until standards are met. Requirements for reseeding of unsuccessful temporary seeding will be considered on a case-by-case basis.

Species	Application Rate PLS – Pounds per Acre
Wheatgrass, Western (Arriba)	3.00
Wheatgrass, Pubescent (Luna)	3.00
Paiute Orchard Grass	2.00
Ricegrass, Indian (Nezpar or Paloma)	1.00
Milkvetch, Cicer (Monarch)	0.50
Small Burnet (Delar)	0.50
Flax, Lewis, Blue (Appar)	0.50
Saltbush, Four-wing	2.00
Penstemon, Rocky Mountain	0.50
	13.00 lbs. Total PLS/acre

7. Mulch shall be applied within 24 hours following completion of seeding. In areas of interim reclamation that used drill-seeding, mulch shall consist of certified weed-free straw or certified weed-free native grass hay that is crimped into the soil. Hydromulching shall be used in areas of interim reclamation where crimping is impracticable, in areas of interim reclamation that were hydroseeded, and in areas of temporary seeding, regardless of seeding method.

NOTE: Mulch is not required in areas where erosion potential mandates use of a biodegradable erosion-control blanket (straw matting).

D. Erosion Control: Cut-and-fill slopes shall be protected against erosion with the use of pocking/ pitting, water bars, lateral furrows, or other measures approved by the authorized officer. Biodegradable straw matting, bales or wattles of weed-free straw or weed-free native grass hay, or well-anchored fabric silt fence shall be used on cut-and-fill slopes and along drainages to protect against soil erosion. Additional BMPs shall be employed as necessary to reduce erosion and offsite transport of sediment.

E. Site Protection: A reclaimed pad shall be fenced to BLM standards to exclude livestock grazing for the first two growing seasons or until seeded species are firmly established, whichever comes later. The seeded species will be considered firmly established when at least 50 percent of the new plants are producing seed. The authorized officer will approve the type of fencing.

F. Monitoring: The operator shall annually survey and report vegetative cover on all disturbed sites, to monitor reclamation success and weed management. An annual report shall be submitted to the BLM Field no later than December 1 of each year.

1. Reclaimed areas shall be monitored annually. The annual report shall document whether attainment of reclamation objectives appears likely. If one or more objectives appear unlikely to be achieved, the report shall identify appropriate corrective actions. Upon review and approval of the report by the BLM, the operator shall be responsible for implementing the corrective actions or other measures specified by the authorized officer.

2. Reports regarding invasive species and weed management and reclamation success shall be submitted to the Grand Junction Field no later than December 1 of each year, in compliance with the joint BLM/Forest Service *Noxious and Invasive Weed Management Plan for Oil and Gas Operators*.

3. Adaptive management techniques to support reclamation success and standards may be required. Reclamation will be considered successful when the site is protected from erosion and revegetated with a self-sustaining, vigorous, diverse, native (or otherwise approved) plant community that minimizes loss of habitat, visual resources, and forage.

19. Weed Control:
The operator shall regularly monitor and promptly control noxious weeds or other undesirable plant species as set forth in the joint BLM/Forest Service *Noxious and Invasive Weed Management Plan for Oil and Gas Operator*, dated March 2007. A Pesticide Use Proposal (PUP) must be approved by the BLM prior to the use of herbicides. Annual weed monitoring reports shall be submitted by **December 1**. Contact Sparky Taber, Grand Junction Field Office Weed Mgr, at 970-244-3004 or mark_taber@blm.gov.

20. Range Management:
Range improvements (fences, gates, reservoirs, pipelines, etc) shall be avoided during development of natural gas resources, to the extent possible. If range improvements are damaged during exploration and development, the operator will be responsible for repairing or replacing the damaged range improvements. If a new or improved access road bisects an existing livestock fence, steel frame gate(s) or a cattleguard with associated bypass gate shall be installed across the roadway to control grazing livestock.

21. Big Game Winter Range Timing Limitation:
Where lease stipulations do not apply to areas identified as winter range, a Timing Limitation (TL) period from January 1 to March 1 shall apply. To minimize impacts to wintering big game, no construction, drilling, completion, or other intensive activities shall occur. Further, from December 1 to May 1, remote sensing should be used for production monitoring, and unavoidable monitoring or maintenance activities should be conducted between 9am and 3pm. Requests for exceptions shall be submitted in writing, by letter or sundry notice, to the Grand Junction Field Office Manager.

Where lease stipulations do apply to areas identified as winter range, a Timing Limitation (TL) period from December 1 to May 1 shall apply. To minimize impacts to wintering big game, no construction, drilling, completion, or other intensive activities shall occur. Further, during this TL, remote telemetry shall be used to monitor production. Unavoidable monitoring or maintenance activities shall be conducted between 9am and 3pm to the extent possible. Requests for exceptions shall be submitted in writing, by letter or sundry notice, to the Grand Junction Field Manager.

22. Birds of Conservation Concern (BCC), Migratory Bird Treaty Act, and BLM IM 2008-050:
All surface-disturbing activities, especially vegetation removal, are prohibited between May 15 and July 15, to prevent potential taking of migratory birds and/or eggs, unless otherwise approved in writing by the Grand Junction Field Office Manager. Exception to this may be granted if vegetation removal is accomplished prior to May 15 **or** if nesting surveys conducted no more than one week prior to surface-disturbing activities indicate that no BCC species are nesting or otherwise present within 10 meters of the area to be disturbed. Nesting surveys shall include an audial survey for diagnostic vocalizations in conjunction with a visual survey for adults and nests. Surveys shall be conducted by a qualified breeding bird surveyor between sunrise and 10:00 AM under favorable conditions for detecting and identifying a BCC species.

All production equipment with a chimney, vent, or stack shall be fitted with a device that will prevent birds from entering the chimney, such as an excluder cone or equivalent.

Any birds found dead or apparently ill near an oil and gas installation/ location must be reported to the Grand Junction Field Office within three days of discovery.

23. Raptor Nesting:
Situation A – Raptor Survey Conducted for this Project or Previous NEPA, and Nest(s) Found:

> Raptor Nesting. Raptor nest surveys conducted in 2006 within the project vicinity resulted in the location of one nest structure within 0.25 miles of pad the OM35 access road and one nest within 0.3 mile of the G30 pad. To protect nesting raptors, the COGCC established species specific nest buffer zones in addition to Timing Limitations (TL) varying between 60 and 90 days for the following:

Raptor Nest Buffer Distances and Timing Limitations		
Species	Active Nest Buffer	TL Period
Bald eagle	0.5 Mile (Nest); 0.5 Mile (Winter Roost)	March 1 – May 31 (Nest) December 1 – January 28 (Winter Roost)
Burrowing owl	150 Feet	April 1 – June 30
Golden eagle	0.5 Mile	March 1 – May 31
Ferruginous hawk	0.5 Mile	March 1 – May 31

Northern goshawk	0.5 Mile	March 1 – May 31
Osprey	0.25 Mile	March 1 – May 31
Peregrine falcon	0.5 Mile	March 1 – May 31
Prairie falcon	0.5 Mile	March 1 – May 31
All other raptor species (e.g., red-tailed hawk, Cooper's hawk, etc.)	0.25 Mile	March 1 – May 31

An exception to this TL may be granted by the BLM for any year in which a subsequent survey determines one of the following: (a) the nest is in a severely dilapidated condition or has been destroyed due to natural causes, (b) the nest is not occupied during the normal nesting period for that species, (c) the nest was occupied but subsequently failed due to natural causes, or (d) the nest was occupied but the nestlings have fledged and dispersed from the nest. In the case of a dilapidated nest or one that was destroyed due to natural causes, the TL shall apply to any alternate or replacement nest within the buffer widths specified above, unless an exception is granted for the alternate or replacement nest for one of the reasons listed. BLM considers surveys conducted for a NEPA Environmental Assessment to be valid for 2 years from date of completion. Contact Heidi Plank, GJFO Wildlife Biologist, at 970-244-3012 or heidi_plank@blm.gov.

Situation B – Raptor Survey for this Project or Previous NEPA, and No Nest(s) Found:

Raptor Nesting. When raptor nest surveys do not result in the location of raptor nest structures within 0.5 mile of a well pad or 0.25 mile of an access road, pipeline, or other surface facility the application of a TL will not occur. Although BLM considers surveys conducted for a NEPA Environmental Assessment to be valid for 2 years from date of completion, new nests may be built and occupied between the initial surveys and project implementation. To ensure compliance with the Migratory Bird Treaty Act, the operator should schedule construction or drilling activities to begin outside the raptor nesting season (February 1 to August 15) if practicable. If initiation of construction or drilling during these dates cannot be avoided, the operator is responsible for complying with the Migratory Bird Treaty Act, which prohibits the "take" of birds or active nests (those containing eggs or young), including nest failure caused by noise and human activity. Contact Heidi Plank, GJFO Wildlife Biologist, at 970-244-3012 or heidi_plank@blm.gov.

Situation C – Federally Connected Actions, No Bird Surveys Done

Raptor Nesting. To ensure compliance with the Migratory Bird Treaty Act (MBTA) with respect to nesting raptors, the operator should schedule construction or drilling activities to begin outside the raptor nesting season (February 1 to August 15). The MBTA prohibits the "take" of birds or active nests (those containing eggs or young) including direct take and nest failure caused by noise and human activity. Contact Heidi Plank, GJFO Wildlife Biologist, at 970-244-3012 or heidi_plank@blm.gov for more information.

24. Visual Resources:
Pads, roads, pipeline, and production facilities shall be located and placed to avoid or minimize visibility from travel corridors, residential areas, and other potentially sensitive observation points, unless directed otherwise by the BLM due to other resource concerns, and shall be placed to maximize reshaping of cut-and-fill slopes and interim reclamation of the pad.

To the extent practical, existing vegetation shall be preserved when clearing and grading for pads, roads, and pipelines. The authorized officer may direct that cleared trees and rocks be salvaged and redistributed over reshaped cut-and-fill slopes or along linear features.

Above-ground facilities shall be painted a natural color in a non-reflective finish selected to minimize contrast with adjacent vegetation or rock outcrops. The color shall be specified by the BLM and attached as a COA to individual APDs.

To mitigate straight-line visual effects of cut slopes or cleared vegetation, adaptive management techniques may be required by BLM staff after construction. If a high degree of visual contrast is created by cut or fill slopes or by margins of pads or by pipeline clear-cuts, other adaptive techniques could include additional tree removal along contrasting edges, to create irregularly shaped openings or more natural-looking mosaic patterns.

25. Paleontological Resources:
All persons associated with operations under this authorization shall be informed that any objects or sites of paleontological or scientific value, such as vertebrate or scientifically important invertebrate fossils, shall not be damaged, destroyed, removed, moved, or disturbed. If, in connection with operations under this authorization any of the above resources are encountered, the operator shall immediately suspend all activities in the immediate vicinity of the discovery that might further disturb such materials and notify the BLM authorized officer of the findings. The discovery must be protected until notified to proceed by the BLM authorized officer.

The operator shall suspend ground-disturbing activities at the discovery site and immediately notify the BLM authorized officer of any finds. If ground-disturbing activities may not be halted, the operator shall work around or safely set aside the discovery, for the BLM-permitted paleontologist. Operations may resume at the discovery site upon receipt of instructions and authorization by the BLM authorized officer. Approval to proceed will be based upon evaluation of the resource, by a qualified professional selected by the BLM authorized officer from a Federal agency, insofar as practical. When not practicable, the operator shall bear the cost of the services of a non-Federal professional.

26. Cultural Education/Discovery:
All persons in the area who are associated with this project shall be informed that if anyone is found disturbing historic, archaeological, or scientific resources, including collecting fossils or artifacts, the person or persons will be subject to prosecution.

Pursuant to 43 CFR 10.4(g), the BLM authorized officer shall be notified by telephone, with written confirmation, immediately upon the discovery of human remains, funerary items, sacred objects, or objects of cultural patrimony. Further, pursuant to 43 CFR 10.4 (c) and (d), activities shall stop in the vicinity of the discovery, and the discovery shall be left intact and protected for 30 days or until notified by the BLM authorized officer to proceed.

If in connection with operations under this contract, the operator, its contractors, their subcontractors, or the employees of any of them discovers, encounters, or becomes aware of any objects or sites of cultural value or scientific interest such as historic ruins or prehistoric ruins, graves or grave markers, fossils, or artifacts, the operator shall immediately suspend all operations in the vicinity of the cultural resource and shall notify the BLM authorized officer of the findings (16 USC 470h-3, 36 CFR 800.112). Operations may resume at the discovery site upon receipt of written instructions and authorization by the BLM authorized officer. Approval to proceed will be based upon evaluation of the resource. Evaluation shall be by a qualified professional selected by the BLM authorized officer from a Federal agency insofar as

practicable. When not practicable, the operator shall bear the cost of the services of a non-Federal professional.

Within five working days, the BLM authorized officer will inform the operator as to:

- whether the materials appear eligible for the National Register of Historic Places
- what mitigation measures the holder will likely have to undertake before the site can be used (assuming that *in-situ* preservation is not necessary)
- the timeframe for the BLM authorized officer to complete an expedited review under 36 CFR 800.11, or any agreements in lieu thereof, to confirm through the SHPO State Historic Preservation Officer that the findings of the BLM authorized officer are correct and that mitigation is appropriate

The operator may relocate activities to avoid the expense of mitigation and delays associated with this process, as long as the new area has been appropriately cleared of resources and the exposed materials are recorded and stabilized. Otherwise, the operator shall be responsible for mitigation costs. The BLM authorized officer will provide technical and procedural guidelines for relocation and/or mitigation. Upon verification from the BLM authorized officer that the required mitigation has been completed, the operator will be allowed to resume construction.

Antiquities, historic ruins, prehistoric ruins, and other cultural or paleontological objects of scientific interest that are outside the authorization boundaries but potentially affected, either directly or indirectly, by the proposed action shall also be included in this evaluation or mitigation. Impacts that occur to such resources as a result of the authorized activities shall be mitigated at the operator's cost, including the cost of consultation with Native American groups.

Any person who, without a permit, injures, destroys, excavates, appropriates or removes any historic or prehistoric ruin, artifact, object of antiquity, Native American remains, Native American cultural item, or archaeological resources on public lands is subject to arrest and penalty of law (16 USC 433, 16 USC 470, 18 USC 641, 18 USC 1170, and 18 USC 1361).

27. Centralized Water Collection:
In order to minimize construction disturbance, truck traffic, dust and other impacts to air quality, as well as impacts to fragile soils and wildlife, all produced water shall be transported from well locations via buried pipelines to a central location, such as a tank battery at the site of an injection well or at a water-handling facility or pad. Pipelines shall be collocated with gas pipelines and roadways whenever possible. Exception to this condition may be granted for exploratory wells located at impractical distances from infrastructure. Requests for exceptions shall be submitted in writing, by APD, sundry notice or letter, to the Grand Junction Field Manager.

Standard Surface Use Conditions of Approval
Glenwood Springs Energy Office
Applicable to All Activities within the Orchard Master Development Plan

The following standard surface use COAs apply in addition to all stipulations attached to the respective Federal leases and in addition to any site-specific COAs for individual well pads, pipelines, and roads.

1. Administrative Notification:
At least 48 hours prior to construction, the operator shall notify the BLM representative of construction startup plans. Prior to construction, operator shall stake and/or flag the edge of disturbance associated with pad, road, and pipeline projects.

2. Air Quality:
All internal combustion equipment will be kept in good working order.

EnCana will comply with all CAAQS and NAAQS air quality standards.

EnCana and its contractors will treat primary access roads and heavily used resource roads as necessary or as directed by the Authorized Officer with dust suppressants (e.g., $MgCl_2$) during high use periods, and will water well pad access roads as necessary to control fugitive dust during the summer. The level and type of treatment (watering or application of various dust agents, surfactants, and road surfacing material) may be changed in intensity and must be approved by the Authorized Officer. Dust control is needed to prevent heavy plumes of dust from road use that create safety problems and disperse heavy amounts of particulate matter on adjacent vegetation.

Speed control measures on all project-related unpaved roads shall also be implemented to reduce vehicle fugitive dust concerns, as well as for human health and safety reasons.

3. Cultural Resource/Native American:
Class III cultural resource inventories will be required on any and all new wells, access roads, pipelines and other ground disturbing activities not covered in this plan that require a Federal permit or authorization to conduct the action. Additional action specific mitigation may be required – including but not limited to moving the location, archeological monitoring, testing, or data recovery

Strict adherence to the confidentiality of information concerning the nature and location of archaeological resources will be required of Operator and their subcontractors (Archaeological Resource Protection Act 16 U.S.C. 470hh).

The Native American Graves Protection and Repatriation Act (NAGPRA), requires that if inadvertent discovery of Native American Remains or Objects occurs, activity must cease in the area of discovery, a reasonable effort made to protect the item(s) discovered, and immediate notice made to the BLM Authorized Officer, as well as the appropriate Native American group(s) (IV.C.2). Notice may be followed by a 30-day delay (NAGPRA Section 3(d)).

Colorado State Statues (CRS 24-80-401 and CRS 24-80-1301) for Historic, Prehistoric, and Archaeological Resources, and for Unmarked Human Graves will have to be adhered to by Operator and their subcontractors on private lands. These State statues require that the Federal Authorizing Officer be notified immediately of any historic or prehistoric finds or human grave. The find must be protected until the Authorizing Officer indicates that the action may proceed.

4. Cultural Resource Education/Discovery:
All persons in the area who are associated with this project must be informed that if anyone is found disturbing historic, archaeological, or scientific resources, including collecting artifacts, the person or persons will be subject to prosecution.

Pursuant to 43CFR10.4(g), the BLM authorized officer must be notified, by telephone, with written confirmation, immediately upon the discovery of human remains, funerary items, sacred objects, or objects of cultural patrimony. Further, pursuant to 43CFR10.4 (c) and (d), activities must stop in the vicinity of the discovery and the discovery must be protected for 30 days or until notified to proceed by the authorized officer.

If in connection with operations under this contract the project proponent, his contractors, subcontractors, or the employees of any of them, discovers, encounters or becomes aware of any objects or sites of cultural or paleontological value or scientific interest such as historic or prehistoric ruins, graves or grave markers, fossils, or artifacts, the proponent shall immediately suspend all operations in the vicinity of the cultural or paleontological resource and shall notify the BLM authorized officer of the findings (16 U.S.C. 470h-3, 36CFR800.112). Operations may resume at the discovery site upon receipt of written instructions and authorization by the authorized officer. Approval to proceed will be based upon evaluation of the resource. Evaluation shall be by a qualified professional selected by the authorized officer from a Federal agency insofar as practicable. When not practicable, the holder shall bear the cost of the services of a non-Federal professional.

Within five working days the authorized officer will inform the holder as to:

- whether the materials appear eligible for the National Register of Historic Places;
- the mitigation measures the holder will likely have to undertake before the site can be used (assuming in situ preservation is not necessary); and,
- a time frame for the authorized officer to complete an expedited review under 36 CFR 800.11, or any agreements in lieu thereof, to confirm through the State Historic Preservation Officer that the findings of the authorized officer are correct and the mitigation is appropriate.

The proponent may relocate activities to avoid the expense of mitigation and/or the delays associated with this process, as long as the new area has been appropriately cleared of resources and the exposed materials are recorded and stabilized. Otherwise, the proponent will be responsible for mitigation costs. The authorized officer will provide technical and procedural guidelines for the conduct of mitigation. Upon verification from the authorized officer that the required mitigation has been completed, the proponent will then be allowed to resume construction.

Antiquities, historic, prehistoric ruins, or objects of scientific interest that are outside of the authorization boundaries but directly associated with the impacted resource will also be included in this evaluation and/or mitigation.

Antiquities, historic, prehistoric ruins, or objects of scientific interest, identified or unidentified, that are outside of the authorization and not associated with the resource within the authorization will also be protected. Impacts that occur to such resources, which are related to the authorizations activities, will be mitigated at the proponent's cost including Native American consultation cost.

In situations where Federal action is required for wells directionally drilled into Federal minerals from fee surface overlying fee minerals, BLM's responsibilities under Section 106 of the National Historic Preservation Act [(NHPA) 16 U.S.C. 470] as amended and Section 36 CFR 800.4 will be followed.

5. Geology:
Mitigation measures for protection of geologic resources are detailed in the Down Hole Standard Conditions of Approval listed in Appendix D. These measures include specific procedures for drilling, cementing, and completing the proposed wells to ensure that gas does not migrate into usable water-bearing zones or contaminate other geologic formations. The OMDP also describes methods for minimizing the potential for slope instability and erosion, and for interim and final reclamation of disturbed surfaces.

6. Groundwater / Soils / Water Quality:
After the completion of drilling operations, the producing formation will be logged and production casing run and cemented in accordance with the drilling program approved in the APD.

In order to isolate the Mesa Verde -Wasatch contact, production casing on Federal wells will have a cement top at a minimum of 200 feet above the top of Mesa Verde formation.

Any shallow groundwater zones encountered during drilling of the proposed wells will be properly protected and the presence of these zones reported to the BLM and COGCC. All usable water zones encountered (those with TDS less than 10,000 mg/L) must be isolated and protected, whether they are shallow or deep. Isolation of shallow zones will be accomplished by setting and cementing surface casing from a depth of at least 50 feet below the deepest water zone to the ground surface. Deeper water-bearing zones will be cemented off as required in the Master APD. For these zones, cementing will be used from 50 feet above to 50 feet below each water-bearing zone.

For pads where a reserve pit is used, EnCana will construct a lined reserve pit to receive the drill cuttings from the wellbore (mainly shale, sand, and miscellaneous rock minerals) and to contain drilling fluids carried over with the cuttings. No hazardous substances will be placed in the pit.

In accordance with EnCana's standard policy and current BLM Gold Book standards, all reserve pits will utilize impermeable liners to contain drilling fluids. Following completion activities, pit liners will be removed at the respective landowner's request. At the discretion of EnCana and in cooperation with the respective landowner, closed-loop drilling systems may be used on well pads within 100 feet of intermittent drainages.

A minimum of 2 feet of freeboard shall be maintained in the reserve pit. Freeboard is measured from the highest level of drilling fluids and cuttings in the reserve pit to the lowest surface elevation of ground at the reserve pit perimeter. All vehicles will be refueled at least 100 feet from stream channels.

Frac pits to contain water used in completion process will be planned for each new pad location in the OMDP that does not recycle its frac fluid. Frac pits will also be lined. Compliance with Onshore Order #1 would determine the timing and closure of frac pits. In instances where well drilling would occur in more than 1 drilling season on a pad, the frac pit will be drained dry prior to winter shutdown period or expiration of 90-day period, whichever occurs first. The liner in drained frac pits will be retained until frac pit use is completed.

EnCana will consult with the Army Corps of Engineers (for Section 404 permits) and with the State of Colorado Water Quality Control Division (for stormwater permits) prior to commencing construction

activities within the OMDP. Written documentation of this action will be provided to the BLM to ensure that appropriate permits have been obtained or are not required by the authorizing agency.

EnCana will consult with the US Army Corps of Engineers to obtain approval prior to discharging fill material into waters of the US in accordance with Section 404 of the Clean Water Act. Waters of the US are defined in 33 CFR Section 328.3. Written documentation to the BLM Authorized Officer is required within 30 days of the APD approval date to indicate that the US Army Corps of Engineers has been notified prior to construction or that 404 Permits have been obtained or are not required by the permitting agency. Written documentation may be a copy of the Pre-Construction Notification (PCN) Form or an official verification letter from the US Army Corps of Engineers to the operator stating that a permit has been issued or is not required for the activities in question. Contact Sue Nall at 970-243-1199 x16 or susan.nall@usace.army.mil.

EnCana will consult with the State of Colorado Water Quality Control Division (contact Matt Czahor at: 303-692-3575 or matthew.czahor@state.co.us) regarding Stormwater Discharge Permits prior to commencing construction activities. All construction activities that disturb one acre or greater require a Stormwater Discharge Permit. Written documentation to the BLM Authorized Officer is required within 30 days of the APD approval date to indicate that appropriate permits have been obtained. Written documentation may be a copy of the Stormwater Discharge Permit or an official verification letter from the State Water Quality Control Division to the operator that includes the Permit Certification Number.

EnCana will implement aggressive reclamation and revegetation of disturbed areas not needed for operational activities. These measures will help prevent erosion and sedimentation to drainages. In addition, EnCana will implement multiple BMPs, including the following:

All new access roads in the OMDP will be crowned and ditched to allow water to flow off the road surface to reduce volume and velocity as per current BLM Gold Book standards. Existing roads will be maintained to these standards.

As per BLM Gold Book Standards, gravel or other surfacing is required for steep grades, highly erosive soils, clay soils, and/or where all-weather access is needed.

Relief ditches or corrugated metal pipes will be installed at regular intervals as per current BLM Gold Book standards (25-year, 6-hour and 25-year, 24-hour storm events) to direct drainage off of the road grade and into vegetated areas, where it will infiltrate into the ground and sediment will settle out on the surface. The minimum culvert diameter in any installation will be 18 inches. For further information contact Noel Ludwig, Glenwood Springs Energy Office Hydrologist, at 970-947-5215 or noel_ludwig@blm.gov.

Crossings of drainages deemed to be jurisdictional waters of the U.S. pursuant to Section 404 of the Clean Water Act may require additional culvert design capacity. Due to the flashy nature of area drainages and anticipated culvert maintenance, the U.S. Army Corps of Engineers recommends designing drainage crossings for the 100-year event. Contact Sue Nall at 970-243-1199 x16 or susan.nall@usace.army.mil.

In accordance with EnCana's standard policy, proper erosion protection and silt retention techniques such as silt catchment dams, staked straw wattles, culverts or drainage dips, and surface rock (riprap) will be installed above and below locations road crossings. Within areas less than 100 feet from intermittent drainages, an adequate vegetative buffer, artificial buffers (e.g., straw bales, matting, etc.), or filter strip will be maintained between the road and the drainage to filter runoff from the road before it reaches the creek, wherever possible.

Pipelines installed beneath stream crossings will be buried at a minimum depth of 4 feet below the channel substrate to avoid exposure by channel scour and degradation. Following burial, the channel grade and substrate composition will be returned to pre-construction conditions.

All culverts that have currently failed or culverts not aligned in the natural drainage of the channel will be replaced and aligned with the natural channel of the drainage with a gradient that maintains the natural drainage velocity to decrease sedimentation and erosion. Destroyed, damaged, or inoperable culverts will be removed from the OMDP area and disposed of by Operator.

Construction activities at perennial, intermittent, and ephemeral drainage crossings will be timed to avoid high flow conditions.

Culverts will be inspected annually to ensure they are functioning properly and will be promptly maintained (e.g., by removing any debris causing blockage) or replaced when necessary.

Ditches will be allowed to vegetate (though not with noxious weeds) and/or will include large rocks or stones to slow the velocity of drainage and allow sediment to settle out.

Where drainage ditches are installed to direct runoff away from the road on steeper grades, water bars or hay bale dikes will be installed nearly perpendicular to the flow direction of the ditch to reduce runoff velocity and settle out particulates as per current BLM Gold Book standards.

EnCana's road construction plans will identify specific locations of drainage features and proposed BMPs for approval by the BLM prior to construction.

Straw matting and/or temporary seeding will be placed on excess material piles to help limit dust emissions into the air during weather-created wind events.

7. Weed Control:
The operator shall regularly monitor and promptly control noxious weeds or other undesirable plant species as set forth in the Glenwood Springs Energy Office *Noxious and Invasive Weed Management Plan for Oil and Gas Operators*, dated March 2007. A Pesticide Use Proposal (PUP) must be approved by the BLM prior to the use of herbicides. Annual weed monitoring reports shall be submitted by **December 31**. Contact Beth Brenneman, Glenwood Springs Energy Office Ecologist, at 970-947-5232 or beth_brenneman@blm.gov.

8. Raptors, Migratory Birds, and Birds of Conservation Concern:
(The following scenarios describe particular instances where Raptor Surveys would be required)

Situation A – Raptor Survey Conducted for this Project or Previous NEPA, and Nest(s) Found:

Raptor Nesting. Raptor nest surveys in the project vicinity resulted in the location of one or more raptor nest structures within [0.25 mile of a well pad or 0.125 mile of an access road, pipeline, or other surface facility – select language based on project]. To protect nesting raptors, a 60-day Timing Limitation (TL) shall be applied to the initiation of construction [or drilling] activities within the buffer width[s] specified above. This TL shall apply during the period X to Y *[dates depend on the particular species – consult with Jeff Cook]*. An exception to this TL may be granted for any year in which a subsequent survey determines one of the following: (a) the nest is in a severely dilapidated condition or has been destroyed due to natural causes, (b) the nest is not occupied during the normal nesting period for that species, (c) the nest was occupied but subsequently failed due to natural causes, or (d) the nest was occupied but the nestlings have fledged and dispersed from the nest. In the

case of a dilapidated nest or one that was destroyed due to natural causes, the TL shall apply to any alternate or replacement nest within the buffer widths specified above, unless an exception is granted for the alternate or replacement nest for one of the reasons listed. Contact Jeff Cook, Glenwood Springs Energy Office Wildlife Biologist, at 970-947-5231 or jeffrey_cook@blm.gov).

Situation B – Raptor Survey for this Project or Previous NEPA, and No Nest(s) Found:

Raptor Nesting. Raptor nest surveys did not result in location of raptor nest structures within 0.25 mile of a well pad or 0.125 mile of an access road, pipeline, or other surface facility. Therefore, a Raptor Nesting Timing Limitation COA is not attached to this APD. Although BLM considers surveys conducted for a NEPA Environmental Assessment to be valid for 5 years, new nests may be built and occupied between the initial surveys and project implementation. To ensure compliance with the Migratory Bird Treaty Act, the operator should schedule construction or drilling activities to begin outside the raptor nesting season (February 1 to August 15) if practicable. If initiation of construction [or drilling] during these dates cannot be avoided, the operator is responsible for complying with the Migratory Bird Treaty Act, which prohibits the "take" of birds or active nests (those containing eggs or young), including nest failure caused by noise and human activity. Contact Jeff Cook, Glenwood Springs Energy Office Wildlife Biologist, at 970-947-5231 or jeffrey_cook@blm.gov).

Situation C – Raptor Survey Not Conducted but Urgency Prevents a Survey before Project Approval:

Raptor Nesting. To protect nesting raptors, a survey shall be conducted prior to construction [or drilling] activities that are to be initiated during the raptor nesting season (February 1 to August 15). The survey shall include all potential nesting habitat within 0.25 mile of a well pad or 0.125 mile of an access road, pipeline, or other surface facility. Results of the survey shall be submitted to the BLM. Contact Jeff Cook, Glenwood Springs Energy Office Wildlife Biologist, at 970-947-5231 or jeffrey_cook@blm.gov. If a raptor nest is located within the buffer widths specified above, a 60-day Timing Limitation (TL) shall be applied to prohibit initiation of construction and drilling activities. The dates of this TL will be based on the particular species of raptor.

It shall be the responsibility of the operator to comply with the Migratory Bird Treaty Act (MBTA) with respect to "take" of migratory bird species. Under the MBTA, "take" means to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The operator shall prevent use by migratory birds of any pit containing fluids associated with oil or gas operations—including but not limited to reserve pits, produced water pits, frac-water pits, cuttings trenches (if covered by water/fluid), and evaporation pits. Fluids in these pits may pose a risk to migratory birds (e.g., waterfowl, shorebirds, wading birds, songbirds, and raptors) as a result of ingestion, absorption through the skin, or interference with buoyancy and temperature regulation. Several established methods to prevent bird access are known to be effective, such as netting or bird-balls. However, the USFWS has determined that the use of flagging is ineffective in deterring birds from using ponds or pits and provides no assurance of compliance with the MBTA. Regardless of the method used, it should be employed as soon as practicable after the pit has begun receiving liquids. At a minimum, the method shall be in place within 24 hours following the placement of fluids into a pit. Because of high toxicity to birds, oil slicks and oil sheens should immediately be skimmed off the surface of any pit that is not netted. The most effective way to eliminate risk to migratory birds is prompt drainage, closure, and reclamation of pits, which is strongly encouraged. All mortality or injury to species protected by the MBTA shall be reported immediately to the BLM project lead and to the U.S. Fish and Wildlife Service. For further assistance, contact Creed Clayton, USFWS Biologist assigned to the Glenwood Springs Energy Office, at 970-947-5219 or creed_clayton@fws.gov, and visit http://www.fws.gov/mountain-prairie/contaminants/oilpits.htm.

Pursuant to BLM Instruction Memorandum 2008-050, all surface-disturbing activities are prohibited from May 1 to June 30 to reduce impacts to Birds of Conservation Concern (BCC). An exception to this COA will be granted if nesting surveys conducted no more than one week prior to surface-disturbing activities indicate that no BCC species are nesting or otherwise present within 10 meters of the area to be disturbed. Nesting surveys shall include an audial survey for diagnostic vocalizations in conjunction with a visual survey for adults and nests. Surveys shall be conducted by a qualified breeding bird surveyor between sunrise and 10:00 AM under favorable conditions for detecting and identifying a BCC species. Contact Jeff Cook, Glenwood Springs Energy Office Wildlife Biologist, at 970-947-5231 or jeffrey_cook@blm.gov).

9. Noise:
During drilling and completion, the operator will angle the exhaust muffler stacks on the power units or generators away from private homes. The operator will encourage commuting of construction and drilling crews to mitigate vehicle noise impacts. Operator will use telemetry equipment at all gas well meters to reduce pumper-truck traffic within the OMDP area.

10. Paleontological Resource Education/Discovery:
All persons associated with operations under this authorization must be informed that any objects or sites of paleontological or scientific value, such as vertebrate or scientifically important invertebrate fossils, shall not be damaged, destroyed, removed, moved, or disturbed. If in connection with operations under this authorization any of the above resources are encountered the proponent shall immediately suspend all activities in the immediate vicinity of the discovery that might further disturb such materials and notify the BLM authorized officer of the findings. The discovery must be protected until notified to proceed by the authorized officer.

As feasible, the proponent shall suspend ground-disturbing activities at the discovery site and immediately notify the BLM authorized officer of any finds. The BLM authorized officer will, as soon as feasible, have a BLM-permitted paleontologist check out the find and record and collect it if warranted. If ground-disturbing activities cannot be immediately suspended, the proponent shall work around or set the discovery aside in a safe place to be accessed by the BLM-permitted paleontologist.

11. Paleontological Resource Monitoring:
If significant fossils resources are encountered, construction activities would be halted and the BLM notified of the occurrence immediately. A qualified paleontologist would then visit the site and make site-specific recommendations for impact avoidance. Operations in the area of the discovery would not resume until authorization to proceed has been received from the BLM Authorized Officer.

12. Range Management:
Range improvements (fences, gates, reservoirs, pipelines, etc.) will be avoided during development of natural gas resources to the maximum extent possible. If range improvements are damaged during exploration and development, the operator will be responsible for repairing or replacing the damaged range improvements.

If a new or improved access road bisects an existing livestock fence, steel frame gate(s) or a cattleguard with associated bypass gate shall be installed across the roadway to control grazing livestock.

13. Reclamation:
The goals, objectives, timelines, measures, and monitoring methods for final reclamation of oil and gas disturbances are described in Appendix I (Surface Reclamation) of the 1998 Draft Supplemental EIS

(DSEIS). Specific measures to follow during interim and temporary (pre-interim) reclamation are described below.

a. Deadline for Temporary Seeding and Interim Reclamation. Topsoil storage piles, stormwater control features, and cut-and-fill slopes shall undergo temporary seeding to stabilize the material and minimize weed infestations within 30 days following completion of pad construction. Interim reclamation to reduce a well pad to the maximum size needed for production shall be completed within 6 months following completion of the last well planned for the pad.

   Both of these deadlines are subject to being extended upon approval of the authorized officer based on season, timing limitations, or other constraints on a case-by-case basis.

b. Topsoil Stripping, Storage, and Replacement. Topsoil shall be stripped following removal of vegetation during construction of well pads, pipelines, roads, or other surface facilities. This shall include, at a minimum, the upper 6 inches of soil. Any additional topsoil present at a site, such as indicated by color or texture, shall also be stripped. The authorized officer may specify a stripping depth during the onsite visit. The stripped topsoil shall be stored separately from subsoil or other excavated material and replaced prior to final seedbed preparation.

c. Seedbed Preparation. For cut-and-fill slopes, initial seedbed preparation shall consist of backfilling and recontouring to achieve the configuration specified in the reclamation plan. For compacted areas, initial seedbed preparation shall include ripping to a minimum depth of 18 inches, with a maximum furrow spacing of 2 feet. Where practicable, ripping shall be conducted in two passes at perpendicular directions. Following final contouring, the backfilled or ripped surfaces shall be covered evenly with topsoil.

   Final seedbed preparation shall consist of scarifying (raking or harrowing) the spread topsoil prior to seeding. If more than one season has elapsed between final seedbed preparation and seeding, and if the area is to be broadcast-seeded or hydroseeded, this step shall be repeated no more than 1 day prior to seeding to break up any crust that has formed.

   Seedbed preparation is not required for topsoil storage piles or other areas of temporary seeding.

   Requests for use of soil amendments, including basic product information, shall be submitted to the BLM for approval.

d. Seed Mixes. A seed mix consistent with BLM standards in terms of species and seeding rate for the specific habitat type shall be used on all BLM lands affected by the project (see Attachments 1 and 2 of the letter provided to operators dated May 1, 2008). Note that temporary seeding allows use of a seed mix containing sterile hybrid non-native species in addition to native perennial species.

   For private surfaces, the menu-based seed mixes are recommended, but the surface landowner has ultimate authority over the seed mix to be used in reclamation. The seed shall contain no noxious, prohibited, or restricted weed seeds and shall contain no more than 0.5 percent by weight of other weed seeds. Seed may contain up to 2.0 percent of "other crop" seed by weight, including the seed of other agronomic crops and native plants; however, a lower percentage of other crop seed is recommended. Seed tags or other official documentation shall be supplied to the BLM Glenwood Springs Energy Office Ecologist (Beth Brenneman, 970-947-5232 or beth_brenneman@blm.gov) at least 14 days before the date of proposed seeding for acceptance. Seed that does not meet the above criteria shall not be applied to public lands.

e. Seeding Procedures. Seeding shall be conducted no more than 24 hours following completion of final seedbed preparation.

Where practicable, seed shall be installed by drill-seeding to a depth of 0.25 to 0.5 inch. Where drill-seeding is impracticable, seed may be installed by broadcast-seeding at twice the drill-seeding rate, followed by raking or harrowing to provide 0.25 to 0.5 inch of soil cover. Hydroseeding and hydromulching may be used in temporary seeding or in areas where drill-seeding or broadcast-seeding/raking are impracticable. Hydroseeding and hydromulching must be conducted in two separate applications to ensure adequate contact of seeds with the soil.

If interim revegetation is unsuccessful, the operator shall implement subsequent reseedings until interim reclamation standards are met. Requirements for reseeding of unsuccessful temporary seeding will be considered on a case-by-case basis.

f. Mulch. Mulch shall be applied within 24 hours following completion of seeding. In areas of interim reclamation that used drill-seeding or broadcast-seeding/raking, mulch shall consist of crimping certified weed-free straw or certified weed-free native grass hay into the soil. Hydromulching shall be used in areas of interim reclamation where crimping is impracticable, in areas of interim reclamation that were hydroseeded, and in areas of temporary seeding regardless of seeding method.

NOTE: Mulch is not required in areas where erosion potential mandates use of a biodegradable erosion-control blanket (straw matting).

g. Erosion Control. Cut-and-fill slopes shall be protected against erosion with the use of water bars, lateral furrows, or other measures approved by the authorized officer. Biodegradable straw matting, bales or wattles of weed-free straw or weed-free native grass hay, or well-anchored fabric silt fence shall be used on cut-and-fill slopes and along drainages to protect against soil erosion. Additional BMPs shall be employed as necessary to reduce erosion and offsite transport of sediment.

h. Site Protection. The pad shall be fenced to BLM standards to exclude livestock grazing for the first two growing seasons or until seeded species are firmly established, whichever comes later. The seeded species will be considered firmly established when at least 50 percent of the new plants are producing seed. The authorized officer will approve the type of fencing.

i. Monitoring. The operator shall conduct annual monitoring surveys of reclaimed areas and shall submit an annual monitoring report to the authorized officer by **December 31** of each year. The monitoring program shall use the four Reclamation Categories defined in Appendix I of the 1998 DSEIS to assess progress toward reclamation objectives. The annual report shall document whether attainment of reclamation objectives appears likely. If one or more objectives appear unlikely to be achieved, the report shall identify appropriate corrective actions. Upon review and approval of the report by the BLM, the operator shall be responsible for implementing the corrective actions or other measures specified by the authorized officer.

14. Recreation:

To promote safety for hunters and project workers alike during hunting season, warning signs should be posted along access roads serving active construction and drilling sites to warn hunters of the presence of workers and associated vehicle traffic in the area.

15. Transportation/ Road Maintenance:
Commuting construction and drilling crews will be encouraged to car pool to reduce the number of vehicle trips on local area roads and associated wear and tear.

All road construction and maintenance activities will adhere to standards identified in the Gold Book, and to the COAs listed in Number 6 above.

The operator will encourage commuting construction and drilling crews to comply with posted speed limits on public roads and limit driving speeds to 20 mph on more primitive access roads to reduce the potential for vehicle collisions. By complying with posted speed limit along County Roads, traffic-related noise will also be reduced at nearby residences.

16. Terrestrial Wildlife:
Where big game winter range areas have been identified and lease stipulations do not apply, no construction, drilling or completion activities shall occur during a Timing Limitation (TL) period from **January 1 to March 1** annually. To further reduce impacts to wintering big game, remote sensing should be used for production monitoring, and unavoidable monitoring or maintenance activities should be conducted between 9 a.m. and 3 p.m., to the extent practicable. These additional recommendations apply to the period from December 1 to April 30. Contact Jeff Cook, Glenwood Springs Energy Office Wildlife Biologist, at 970-947-5231 or jeffrey_cook@blm.gov.

17. Vegetation:
Unless otherwise approved by the Authorized Officer, all trees removed during construction activities would be (1) hydro-axed with vegetative material left on site, (2) cut and chipped via tree chipper with material left on site, or (3) cut, limbed, and bucked to maximum 4-foot lengths and removed from site. The resulting vegetative material left on site would be incorporated into topsoil windrow. Such treatment of trees should be accomplished prior to topsoil segregation. Rootballs would be buried, placed offsite, or scattered over the disturbed area as part of final reclamation. Other vegetation, such as sagebrush and other shrubs, may be scattered offsite or placed on well pad fills to help screen the pads. Cleared and grubbed juniper trees could be windrowed along toe of pad or road fill slopes, and placed back over pad reclamation areas if approved by the Authorized Officer.

18. Visual Resources:
To help mitigate the contrast of bare, recontoured slopes, reclamation will include measures to feather cleared lines of vegetation, and to save and redistribute cleared trees, debris, and rock over reshaped cut and fill slopes.

To reduce the view of production facilities from visibility corridors and private residences, facilities will not be placed in visually exposed locations (i.e., they will be located against backdrops or cut side of pad) and will be placed to allow the maximum reshaping of cut and fill slopes. Furthermore, all above ground facilities will be painted Shale Green (Munsell 5Y4/2) to blend with the existing landscape.

As a general rule, unless otherwise approved by BLM authorized officer, the production pack(s) and storage tanks(s) shall not be set more than 100 feet from the nearest wellhead to satisfy COGCC regulation.

Trees and vegetation would be left along the edges of the pads whenever feasible. Berms may need to be constructed on the fill portion on leading edges of pads with substantial cuts and fills.

19. Wastes, Hazardous or Solid:
EnCana and its contractors will be required to collect and properly dispose of any solid wastes generated by this project. All oil and gas drilling-related CERCLA hazardous substances removed from a location and not reused at another drilling location will be disposed of in accordance with applicable Federal and State regulations, including 43 CFR 3162.7. No oil is to be diverted to a pit except in emergency situations or with prior approval from BLM. Any hydrocarbons that do enter the reserve pit will be removed as soon as possible and processed or disposed of at a permitted offsite facility.

Under the proposed drilling plan, fuel and lubricants will be temporarily stored in transportable containment trailers or tanks on the proposed well pads. EnCana will implement a Spill Prevention, Control, and Countermeasure (SPCC) Plan to minimize potential impacts from unintentional releases. The SPCC Plan will include accidental discharge reporting procedures, spill response, and cleanup measures. All potentially hazardous materials and substances will be handled in an appropriate manner that minimizes the risk of accidental contamination of soil and water resources.

Any release (leaks or spills) of hazardous substances in excess of the reportable quantity, as established by 40 CFR, Part 117, will be reported as required by the CERCLA of 1980, as amended. If the release of a hazardous substance in a reportable quantity does occur, a copy of the report will be furnished to BLM and all other appropriate Federal and state agencies. In addition, all releases to soil or water of 10 gallons or more of any substance will be immediately reported verbally to BLM and COGCC compliance officers, and proof of cleanup will be provided for the project record. This mitigation will be applied at all stages of the project including drilling, completion, operation, and abandonment of wells.

Protection of sensitive environments in the drilling area will be accomplished through the use of a liner in the reserve pit and the construction or installation of secondary containment facilities. All cuttings, drilling fluids, and chemicals are to be contained in the lined pit. Pits will be designed to contain all anticipated drilling muds, cuttings fracture fluids, and precipitation while maintaining at least 2 feet of freeboard. Produced water may be confined to the reserve pit for a period of 90 days after initial production.

No chromate additives will be used in the mud system without prior BLM approval. No hazardous substances specifically listed by EPA as a hazardous waste or demonstrating a characteristic of hazardous waste will be used in drilling, testing, or completion operations.

Tank batteries for the storage of produced water and condensate will be placed within secondary containment to prevent offsite migration of condensate or produced water. Secondary containment may consist of either corrugated steel surrounds, earthen berms, or both. Any earthen berms surrounding the tank batteries will be compacted to prevent lateral movement of fluids through the berm. Secondary containment will be sized to contain a minimum of 110 percent of the storage capacity of the largest tank within each berm. All loading lines will be placed inside the containment berms. In the event of an accidental release, produced water and condensate will be confined for cleanup in the containment area and will not be allowed to migrate to surrounding soils and water.

After cessation of drilling and completion operations and prior to backfilling of pits, all liquid waste will be evaporated or solidified in place and all trash will be removed. If EnCana chooses to solidify pit material in place, a solidification material that does not contain polyacrylamide (e.g., powdered gypsum) should be utilized. The pit liner will be removed to the solids level and taken to the local landfill.

The cuttings in the reserve pit will be buried in place. The pit will be backfilled with native soils and materials. Backfilling will be performed in such a manner as to prevent the re-emergence of the pit liner to the surface such that it interferes with successful long-term site reclamation. Mud and associated solids

will be confined to the pit and not squeezed out and incorporated into the surface materials. The backfilled pit will be covered with a minimum of 3 feet of overburden. When work is complete, the pit area should support heavy equipment without sinking.

During reclamation of these sites, fill material will be pushed into cuts and over the backslope. No depressions will be left that could trap water or form ponds.

20. Centralized Water Collection:
In order to minimize construction disturbance, truck traffic, dust and other impacts to air quality, as well as impacts to fragile soils and wildlife, all produced water shall be transported from well locations via buried pipelines to a central location, such as a tank battery at the site of an injection well or at a water-handling facility or pad. Pipelines shall be collocated with gas pipelines and roadways whenever possible. Exception to this condition may be granted for exploratory wells located at impractical distances from infrastructure. Requests for exceptions shall be submitted in writing, by APD, sundry notice or letter, to the Glenwood Springs Field Manager.

APPENDIX E

U.S. Fish and Wildlife Service ESA Consultations

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APPENDIX F

SITE-SPECIFIC AND DOWNHOLE CONDITIONS OF APPROVAL

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Site-Specific Conditions of Approval

All edible material on OMDP sites shall be contained in approved bear-proof containers. For information on bear-proof trash containers, contact CDOW at 970-255-6100.

OMDP Standard Conditions of Approval will apply and remain in full force and effect, unless superseded by the following site-specific COAs.

ON6:

Right-of-Way (ROW). A BLM ROW grant is required for the off lease well pad. The grant must be obtained prior to any construction of the location. Applicable OMDP Standard Conditions of Approval shall be appended to the grant as Special Stipulations.

Monitoring of Special Status Species Populations. Before construction or other surface disturbance, EnCana shall provide an approved biologist to conduct a vegetation survey during the growing season, in all areas where special status species occur within 200 meters of ground disturbing activities. (These areas are identified in the Special Status Species section of the OMDP EA). Further, follow-up surveys shall be conducted at least once annually.

The first report shall contain photographs of all special status species locations within 200 meters of the project area. They shall be photographed one month before pipeline**,** road, and/or pad construction and within one month after the pipeline, road, and/or pad is constructed. Annual reports will be required through the production and final reclamation phases of development, unless waived by the BLM. Surveys shall include vegetation present, descriptions of species and life forms, and shall describe the state of the special status species and habitat. The report shall also include a narrative of whether impacts, specifically, but not limited to dust, weeds, OHV use, erosion and sedimentation are affecting the special status species. New photos of each special status species location shall be taken at the times of survey and included with the report, to be submitted to the GSFO and GJFO no later than December 1, annually.

60-Day Big Game Winter Range Timing Limitation. To protect crucial big game winter range on leases without timing restrictions, construction and drilling activities are prohibited from January 1 through February 28. Field review and the updated Colorado Division of Wildlife Big Game Winter Habitat mapping clearly identify the well location and access road within these crucial winter ranges.

OP13:

Monitoring of Special Status Species Populations. Before construction or other surface disturbance, EnCana shall provide an approved biologist to conduct a vegetation survey during the growing season, in all areas where special status species occur within 200 meters of ground disturbing activities. (These areas are identified in the Special Status Species section of the OMDP EA). Further, follow-up surveys shall be conducted at least once annually.

The first report shall contain photographs of all special status species locations within 200 meters of the project area. They shall be photographed one month before pipeline**,** road, and/or pad construction and within one month after the pipeline, road, and/or pad is constructed. Annual reports will be required through the production and final reclamation phases of development, unless waived by the BLM. Surveys shall include vegetation present, descriptions of species and life forms, and shall describe the state of the special status species and habitat. The report shall also include a narrative of whether impacts, specifically, but not limited to dust, weeds, OHV use, erosion and sedimentation are affecting the special

status species. New photos of each special status species location shall be taken at the times of survey and included with the report, to be submitted to the GSFO and GJFO no later than December 1, annually.

60-Day Big Game Winter Range Timing Limitation. To protect crucial big game winter range on leases without timing restrictions, construction and drilling activities are prohibited from January 1 through February 28. Field review and the updated Colorado Division of Wildlife Big Game Winter Habitat mapping clearly identify the well location and access road within these crucial winter ranges.

Before pipeline construction along Mesa County V.00 Road in T9S R96W, Sec. 7, NW¼ NW¼, the operator shall certify to GJFO that they have obtained agreements allowing pipeline construction with Mesa County and the US Forest Service.

A steel frame traffic control gate and cattleguard shall be installed at beginning of access road to pad to control public access to private land.

F15OU:

The 60-day Condition of Approval for Big Game Habitat identified in Appendix D in the GSRA Oil & Gas Final SEIS (approved March 24, 1999) will be invoked. This COA states: "To protect crucial big game winter range on leases without timing restrictions, construction and drilling activities are prohibited from January 1 through February 28." The rationale for invoking this COA is based on field review and the updated Colorado Division of Wildlife Big Game Winter Habitat mapping which clearly identifies the well location and access road within these crucial winter ranges.
Access road to F15OU pad shall be constructed with a low water crossing through Little Alkali Creek, unless otherwise approved by the Authorized Officer.

The gathering line and related water lines will be buried along the short access road spur to F15OU pad and south along the existing road to the G15OU pad and pipeline connection. Fuel loadings along the proposed pipeline corridor shall be reviewed prior to construction to determine if cleared trees should be chipped or removed from the work area.

C16OU:

The 60-day Condition of Approval for Big Game Habitat identified in Appendix D in the GSRA Oil & Gas Final SEIS (approved March 24, 1999) will be invoked. This COA states: "To protect crucial big game winter range on leases without timing restrictions, construction and drilling activities are prohibited from January 1 through February 28." The rationale for invoking this COA is based on field review and the updated Colorado Division of Wildlife Big Game Winter Habitat mapping which clearly identifies the well location and access road within these crucial winter ranges.

Move proposed storage tank locations away from south edge of pad to allow for adequate space to reshape the cut slope during interim reclamation.

J16OU:

The 60-day Condition of Approval for Big Game Habitat identified in Appendix D in the GSRA Oil & Gas Final SEIS (approved March 24, 1999) will be invoked. This COA states: "To protect crucial big game winter range on leases without timing restrictions, construction and drilling activities are prohibited from January 1 through February 28." The rationale for invoking this COA is based on field review and the updated Colorado Division of Wildlife Big Game Winter Habitat mapping which clearly identifies the well location and access road within these crucial winter ranges.

M16OU:

The 60-day Condition of Approval for Big Game Habitat identified in Appendix D in the GSRA Oil & Gas Final SEIS (approved March 24, 1999) will be invoked. This COA states: "To protect crucial big game winter range on leases without timing restrictions, construction and drilling activities are prohibited from January 1 through February 28." The rationale for invoking this COA is based on field review and the updated Colorado Division of Wildlife Big Game Winter Habitat mapping which clearly identifies the well location and access road within these crucial winter ranges.

Install steel frame traffic control gate at beginning of access road to pad to control public access to private land.

G17OU:

The Timing Limitation for Lease #COC58675 specifies that no construction ,drilling, or completion work will be allowed from December 1 through April 30 in order to protect important seasonal wildlife habitat (including big game). This limitation does not apply to maintenance and operation of producing wells. Install steel frame traffic control gate at beginning of access road to pad to control public access to private land.

F18OU:

Surface Use Agreements. Before construction or other surface disturbance, the operator shall certify to GJFO that they have obtained agreements allowing surface use and maintenance with the Bureau of Reclamation (BOR) and Mesa County.

Controlled Surface Use to Protect Fragile Soils. To maintain soil productivity, prevent accelerated soil erosion, and protect water quality and quantity, before construction or other surface disturbance, a site-specific plan of development demonstrating performance objectives and standards must be submitted and approved by the BLM.

Pre-Construction Inspection. Before construction or other surface disturbance, a pre-construction onsite shall be held, to coordinate development needs and resource protection. The meeting shall include personnel from the BLM, BOR, and EnCana, including construction, ecology and other appropriate staff.

Monitoring of Special Status Species Populations. Before construction or other surface disturbance, EnCana shall provide an approved biologist to conduct a vegetation survey during the growing season, in all areas where special status species occur within 200 meters of ground disturbing activities. (These areas are identified in the Special Status Species section of the OMDP EA). Further, follow-up surveys shall be conducted at least once annually.

The first report shall contain photographs of all special status species locations within 200 meters of the project area. They shall be photographed one month before pipeline**,** road, and/or pad construction and within one month after the pipeline, road, and/or pad is constructed. Annual reports will be required through the production and final reclamation phases of development, unless waived by the BLM. Surveys shall include vegetation present, descriptions of species and life forms, and shall describe the state of the special status species and habitat. The report shall also include a narrative of whether impacts, specifically, but not limited to dust, weeds, OHV use, erosion and sedimentation are affecting the special status species. New photos of each special status species location shall be taken at the times of survey and included with the report, to be submitted to the GSFO and GJFO no later than December 1, annually.

Additional Special Status Plant Survey Required. The proposed pipeline route from F18OU to G18OU will be surveyed for special status plants prior to any construction activities associated with the proposed pipeline, if there is any proposed ground-disturbance outside of the existing power line corridor.

Special Status Species Protection. To prevent impacts to sensitive resources, dust shall be strictly controlled by the use of water or an approved dust retardant, as directed by the BLM, the BOR, or Mesa County.

Magnesium chloride shall not be applied within 100 meters of any special status species.

Herbicides shall not be applied within 100 meters of Colorado hookless cacti or any special status species. Requests for exceptions shall be submitted in writing, by letter or sundry notice, to the Grand Junction Field Manager.

Winter Timing Limitations. To minimize impacts to important seasonal wildlife, including wintering big game, no construction, drilling, completion, or other intensive activities shall occur from December 1 to May 1. Telemetry shall allow offsite monitoring of the producing well to reduce the amount of trips necessary for well operations during the winter range closure and for protection of other resources. Unavoidable activities shall be conducted between 9am and 3pm, as possible. Requests for exceptions shall be submitted in writing, by letter or sundry notice, to the Grand Junction Field Office Manager.

No Surface Occupancy: Raptor Nesting. No surface use is allowed during 2/1 – 8/15 to protect raptors (including golden eagles, all accipiters, falcons [except kestrels], all buteos and owls) nesting and fledgling habitat during usage for ¼ mile around the nest site. Exceptions may be granted during years when the nest site is unoccupied, when occupancy ends by or after May 15, or once the young have fledged and dispersed from the nest. Requests for exceptions shall be submitted in writing, by letter or sundry notice, to the Grand Junction Field Office Manager.

To protect nesting raptors, a survey shall be conducted prior to well pad construction or the initiation of drilling activities during the raptor nesting season (February 1 to August 15). The survey shall include all potential nesting habitat within 0.5 mile of a well pad or 0.25 mile of an access road, pipeline, or other surface facility. If an active raptor nest is located within the buffer widths specified above, a species specific Timing Limitation (TL) shall be applied to prohibit initiation of construction and drilling activities [subject to site-specific adjustment by BLM based on factors such as visual screening and the type, timing, and duration of the proposed action]. Results of the survey shall be submitted to the BLM. Surveys shall be required if 2 years have lapsed between the initial survey and the commencement of new development activities or if changes to the location of planned infrastructure were made after initial surveys were conducted. Contact Heidi Plank, GJFO Wildlife Biologist, at 970-244-3012 or heidi_plank@blm.gov.

Fencing and Gates. To protect sensitive plant and animal species in the De Beque Wildlife Area, and to prevent public access onto private (BOR) land, a steel frame traffic control gate shall be installed at the beginning of the access road, where it leaves Mesa County Road V.5. Further, a system of steel posts and cables shall be installed off both sides of the gate to inhibit motorized travel around it.

Access. Access shall be via Mesa County Road V.5, not via the two-track road (BLM 7800) through Moffat Gulch, as proposed.

Visual Resource Management (VRM). All structures, including but not limited to storage tanks, meter houses, de-hydrators, and the well head, shall be designed to be as low-profile as possible. Tanks used for

storage of produced water and condensate shall be no taller than 15 feet and shall be set below ground level if necessary to meet visual objectives.

J18OU:

1. Standard Conditions of Approval outlined in Appendix D of the Orchard II MDP will apply and remain in full force and effect.

2. The Timing Limitation for Federal lease COC58675 specifies that no construction, drilling, or completion work will be allowed from December 1 through April 30 in order to protect important seasonal wildlife habitat (including big game). This limitation does not apply to maintenance and operation of producing wells.

3. Location of Proposed storage tanks will be reviewed by BLM and EnCana representatives after pad construction is complete to determine final layout of facilities.

K18OU:

Pre-Construction Inspection. Before construction or other surface disturbance, a pre-construction onsite shall be held, to coordinate development needs and resource protection. The meeting shall include personnel from the BLM, BOR, and EnCana, including construction, ecology and other appropriate staff.

Adobe Thistle Protection. The entire adobe thistle population along the proposed access road to K18OU will be fenced with orange mesh construction fencing prior to ground-disturbing activities associated with the proposed access road. EnCana shall provide an approved biologist to flag the location of the fence and monitor the fence installation to ensure there is no inadvertent damage to the adobe thistle. If the entire adobe thistle population cannot be avoided, seeds will be collected and redistributed into the surrounding area after construction to mitigate the loss of adobe thistle.

Monitoring of Special Status Species Populations. Before construction or other surface disturbance, EnCana shall provide an approved biologist to conduct a vegetation survey during the growing season, in all areas where special status species occur within 200 meters of ground disturbing activities. (These areas are identified in the Special Status Species section of the OMDP EA). Further, follow-up surveys shall be conducted at least once annually.

The first report shall contain photographs of all special status species locations within 200 meters of the project area. They shall be photographed one month before pipeline**,** road, and/or pad construction and within one month after the pipeline, road, and/or pad is constructed. Annual reports will be required through the production and final reclamation phases of development, unless waived by the BLM. Surveys shall include vegetation present, descriptions of species and life forms, and shall describe the state of the special status species and habitat. The report shall also include a narrative of whether impacts, specifically, but not limited to dust, weeds, OHV use, erosion and sedimentation are affecting the special status species. New photos of each special status species location shall be taken at the times of survey and included with the report, to be submitted to the GSFO and GJFO no later than December 1, annually.

Controlled Surface Use to Protect Fragile Soils. To maintain soil productivity, prevent accelerated soil erosion, and protect water quality and quantity, before construction or other surface disturbance, a site-specific plan of development demonstrating performance objectives and standards must be submitted and approved by the BLM.

Construction. To mitigate impacts to fragile soils and visual resources within a highway corridor, side-cast of materials shall be strictly minimized within view of Interstate 70, along the access road and at Pad Corner 2. Excavated fill material shall be hauled to an approved disposal site. Cuts and fills may require adaptive management beyond immediate seeding required by Standard COAs.

Access. Access shall be via Mesa County Road V.5, not via the two-track road (BLM 7800) through Moffat Gulch, as proposed.

Winter Timing Limitations. To minimize impacts to important seasonal wildlife, including wintering big game, no construction, drilling, completion, or other intensive activities shall occur from December 1 to May 1. Telemetry shall allow offsite monitoring of the producing well to reduce the number of trips necessary for well operations during the winter range closure and for protection of other resources. Unavoidable activities shall be conducted between 9am and 3pm, as possible. Requests for exceptions shall be submitted in writing, by letter or sundry notice, to the Grand Junction Field Office Manager. This limitation does not apply to maintenance and operation of producing wells.

No Surface Occupancy: Raptor Nesting. No surface use is allowed during 2/1 – 8/15 to protect raptors (including golden eagles, all accipiters, falcons [except kestrels], all buteos and owls) nesting and fledgling habitat during usage for ¼ mile around the nest site. Exceptions may be granted during years when the nest site is unoccupied, when occupancy ends by or after May 15, or once the young have fledged and dispersed from the nest. Requests for exceptions shall be submitted in writing, by letter or sundry notice, to the Grand Junction Field Office Manager.

To protect nesting raptors, a survey shall be conducted prior to well pad construction or the initiation of drilling activities during the raptor nesting season (February 1 to August 15). The survey shall include all potential nesting habitat within 0.5 mile of a well pad or 0.25 mile of an access road, pipeline, or other surface facility. If an active raptor nest is located within the buffer widths specified above, a species specific Timing Limitation (TL) shall be applied to prohibit initiation of construction and drilling activities [subject to site-specific adjustment by BLM based on factors such as visual screening and the type, timing, and duration of the proposed action]. Results of the survey shall be submitted to the BLM. Surveys shall be required if 2 years have lapsed between the initial survey and the commencement of new development activities or if changes to the location of planned infrastructure were made after initial surveys were conducted. Contact Heidi Plank, GJFO Wildlife Biologist, at 970-244-3012 or heidi_plank@blm.gov.

Visual Resource Management (VRM). All structures, including but not limited to storage tanks, meter houses, de-hydrators, and the well head, shall be designed to be as low-profile as possible. Tanks used for storage of produced water and condensate shall be no taller than 15 feet and shall be set below ground level if necessary to meet visual objectives.

To create a more natural looking landscape in areas of visual sensitivity and to control erosion and enhance vegetation establishment, soil materials re-placed cut-and-fill slopes shall be pocked/pitted with small depressions to form micro-basins, in a "fish scale" pattern constructed perpendicular to the natural flow of water and/or prevailing wind. Such slopes (on pads, access roads, and pipelines) shall be uniformly covered with the depressions, then seeded as directed by the BLM.

B19OU:

Controlled Surface Use to Protect Fragile Soils. To maintain soil productivity, prevent accelerated soil erosion, and protect water quality and quantity, before construction or other surface disturbance, a site-

specific plan of development demonstrating performance objectives and standards must be submitted and approved by the BLM.

No Surface Occupancy: Raptor Nesting. No surface use is allowed during 2/1 – 8/15 to protect raptors (including golden eagles, all accipiters, falcons [except kestrels], all buteos and owls) nesting and fledgling habitat during usage for ¼ mile around the nest site. Exceptions may be granted during years when the nest site is unoccupied, when occupancy ends by or after May 15, or once the young have fledged and dispersed from the nest. Requests for exceptions shall be submitted in writing, by letter or sundry notice, to the Grand Junction Field Office Manager.

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Winter Timing Limitations. To minimize impacts to important seasonal wildlife, including wintering big game, no construction, drilling, completion, or other intensive activities shall occur from December 1 to May 1. Telemetry shall allow offsite monitoring of the producing well to reduce the number of trips necessary for well operations during the winter range closure and for protection of other resources. Unavoidable activities shall be conducted between 9am and 3pm, as possible. Requests for exceptions shall be submitted in writing, by letter or sundry notice, to the Grand Junction Field Office Manager. This limitation does not apply to maintenance and operation of producing wells.

Fencing. To maintain integrity of BLM allotment boundary fence and livestock management, a gated cattleguard with a pass-around gate beside it shall be installed along the allotment boundary wherever the fence is breached for access.

Access. Public access on existing BLM roads shall be maintained at all times.

H19OU:

Winter Timing Limitations. To minimize impacts to important seasonal wildlife, including wintering big game, no construction, drilling, completion, or other intensive activities shall occur from December 1 to May 1. Telemetry shall allow offsite monitoring of the producing well to reduce the number of trips necessary for well operations during the winter range closure and for protection of other resources. Unavoidable activities shall be conducted between 9am and 3pm, as possible. Requests for exceptions shall be submitted in writing, by letter or sundry notice, to the Grand Junction Field Office Manager. This limitation does not apply to maintenance and operation of producing wells.

Controlled Surface Use to Protect Fragile Soils: To maintain soil productivity, prevent accelerated soil erosion, and protect water quality and quantity, before construction or other surface disturbance, a site-specific plan of development demonstrating performance objectives and standards must be submitted and approved by the BLM.

No Surface Occupancy: Raptor Nesting. No surface use is allowed during 2/1 – 8/15 to protect raptors (including golden eagles, all accipiters, falcons [except kestrels], all buteos and owls) nesting and fledgling habitat during usage for ¼ mile around the nest site. Exceptions may be granted during years when the nest site is unoccupied, when occupancy ends by or after May 15, or once the young have fledged and dispersed from the nest. Requests for exceptions shall be submitted in writing, by letter or sundry notice, to the Grand Junction Field Office Manager.

To protect nesting raptors, a survey shall be conducted prior to well pad construction or the initiation of drilling activities during the raptor nesting season (February 1 to August 15). The survey shall include all potential nesting habitat within 0.5 mile of a well pad or 0.25 mile of an access road, pipeline, or other surface facility. If an active raptor nest is located within the buffer widths specified above, a species specific Timing Limitation (TL) shall be applied to prohibit initiation of construction and drilling activities [subject to site-specific adjustment by BLM based on factors such as visual screening and the type, timing, and duration of the proposed action]. Results of the survey shall be submitted to the BLM. Surveys shall be required if 2 years have lapsed between the initial survey and the commencement of new development activities or if changes to the location of planned infrastructure were made after initial surveys were conducted. Contact Heidi Plank, GJFO Wildlife Biologist, at 970-244-3012 or heidi_plank@blm.gov.

Access. Public access on existing BLM roads shall be maintained at all times.

Fencing. To maintain integrity of BLM allotment boundary fence and livestock management, a gated cattleguard with a pass-around gate beside it shall be installed along the allotment boundary wherever the fence is breached for access.

Construction. Topsoil storage pile shall be located to the south edge of the pad and distributed to as shallow a depth as practical, to maintain soil viability.

L19OU:

Winter Timing Limitations. To minimize impacts to important seasonal wildlife, including wintering big game, no construction, drilling, completion, or other intensive activities shall occur from December 1 to May 1. Telemetry shall allow offsite monitoring of the producing well to reduce the number of trips necessary for well operations during the winter range closure and for protection of other resources. Unavoidable activities shall be conducted between 9am and 3pm, as possible. Requests for exceptions shall be submitted in writing, by letter or sundry notice, to the Grand Junction Field Office Manager. This limitation does not apply to maintenance and operation of producing wells.

Raptor Nesting Timing Limitation. To protect nesting raptors, a survey shall be conducted prior to well pad construction or the initiation of drilling activities during the raptor nesting season (February 1 to August 15). The survey shall include all potential nesting habitat within 0.5 mile of a well pad or 0.25 mile of an access road, pipeline, or other surface facility. If an active raptor nest is located within the buffer widths specified above, a 60-day Timing Limitation (TL) shall be applied to prohibit initiation of construction and drilling activities [subject to site-specific adjustment by BLM based on factors such as visual screening and the type, timing, and duration of the proposed action]. Results of the survey shall be submitted to the BLM. Surveys shall be required if 2 years have lapsed between the initial survey and the commencement of new development activities or if changes to the location of planned infrastructure were made after initial surveys were conducted. Contact Heidi Plank, GJFO Wildlife Biologist, at 970-244-3012 or heidi_plank@blm.gov.

Access. Public access on existing BLM roads shall be maintained at all times.

H20OU:

1. Standard Conditions of Approval outlined in Appendix D of the Orchard II MDP will apply and remain in full force and effect.

2. The 60-day Condition of Approval for Big Game Habitat identified in Appendix D in the GSRA Oil & Gas Final SEIS (approved March 24, 1999) will be invoked. This COA states: "To protect crucial big game winter range on leases without timing restrictions, construction and drilling activities are prohibited from January 1 through February 28." The rationale for invoking this COA is based on field review and the updated Colorado Division of Wildlife Big Game Winter Habitat mapping which clearly identifies the well location and access road within these crucial winter ranges.

3. Gathering lines (gas and water) shall be buried alongside edge of proposed access road. Access road shall follow within the existing Sunnyside pipeline corridor where practicable. Proposed pad and road were relocated after onsite review to avoid cultural resource impacts – ensure that impacts are mitigated.

K20OU:

60-Day Big Game Winter Range Timing Limitation. To protect crucial big game winter range on leases without timing restrictions, construction and drilling activities are prohibited from January 1 through February 28. Field review and the updated Colorado Division of Wildlife Big Game Winter Habitat mapping clearly identify the well location and access road within these crucial winter ranges.

Nesting Raptors Timing Limitation. To protect nesting raptors, a survey shall be conducted prior to well pad construction or the initiation of drilling activities during the raptor nesting season (February 1 to August 15). The survey shall include all potential nesting habitat within 0.5 mile of a well pad or 0.25 mile of an access road, pipeline, or other surface facility. If an active raptor nest is located within the buffer widths specified above, a 60-day Timing Limitation (TL) shall be applied to prohibit initiation of construction and drilling activities [subject to site-specific adjustment by BLM based on factors such as visual screening and the type, timing, and duration of the proposed action]. Results of the survey shall be submitted to the BLM. Surveys shall be required if 2 years have lapsed between the initial survey and the commencement of new development activities or if changes to the location of planned infrastructure were made after initial surveys were conducted. Contact Heidi Plank, GJFO Wildlife Biologist, at 970-244-3012 or heidi_plank@blm.gov.

Pre-Construction Inspection. To ascertain that the location is correct as discussed at the onsite inspection, before construction or other surface disturbance, a pre-construction onsite shall be held. The meeting shall include personnel from the BLM and EnCana, including construction, survey and other appropriate staff.

Stormwater and Soils Protection. Armor or anchor fill slope and excess materials pile, especially on northwest side/corner of pad, for stormwater management and soils stability. Seed fill slope and piles per Standard COAs. Brush, rock and trees, excluding pinyon pines, may be scattered at toe of fill.

Access. Public access on existing BLM roads shall be maintained at all times.

Fencing. To maintain integrity of BLM allotment boundary fence and livestock management, a gated cattleguard with a pass-around gate beside it shall be installed along the allotment boundary wherever the fence is breached for access.

Facilities Layout. Production facilities are not approved as proposed, but shall be located and arranged to facilitate safety and minimize long-term surface disturbance, as follows:

1. Water/condensate storage tanks shall be located on cut at the south east quadrant of the pad

2. Production pack shall be located on cut to the east of the well valve, near Corner 1.

3. A minimum distance of 75 feet shall be maintained between facilities with potential as heat or fuel sources.

A21OU:

1. Standard Conditions of Approval outlined in Appendix D of the Orchard II MDP will apply and remain in full force and effect.

2. The 60-day Condition of Approval for Big Game Habitat identified in Appendix D in the GSRA Oil & Gas Final SEIS (approved March 24, 1999) will be invoked. This COA states: "To protect crucial big game winter range on leases without timing restrictions, construction and drilling activities are prohibited from January 1 through February 28." The rationale for invoking this COA is based on field review and the updated Colorado Division of Wildlife Big Game Winter Habitat mapping which clearly identifies the well location and access road within these crucial winter ranges.

K21OU:

1. Standard Conditions of Approval outlined in Appendix D of the Orchard II MDP will apply and remain in full force and effect.

2. The 60-day Condition of Approval for Big Game Habitat identified in Appendix D in the GSRA Oil & Gas Final SEIS (approved March 24, 1999) will be invoked. This COA states: "To protect crucial big game winter range on leases without timing restrictions, construction and drilling activities are prohibited from January 1 through February 28." The rationale for invoking this COA is based on field review and the updated Colorado Division of Wildlife Big Game Winter Habitat mapping which clearly identifies the well location and access road within these crucial winter ranges.

D29OU:

60-Day Big Game Winter Range Timing Limitation. To protect crucial big game winter range on leases without timing restrictions, construction and drilling activities are prohibited from January 1 through February 28. Field review and the updated Colorado Division of Wildlife Big Game Winter Habitat mapping clearly identify the well location and access road within these crucial winter ranges.

Nesting Raptors Timing Limitation. To protect nesting raptors, a survey shall be conducted prior to well pad construction or the initiation of drilling activities during the raptor nesting season (February 1 to August 15). The survey shall include all potential nesting habitat within 0.5 mile of a well pad or 0.25 mile of an access road, pipeline, or other surface facility. If an active raptor nest is located within the buffer widths specified above, a 60-day Timing Limitation (TL) shall be applied to prohibit initiation of construction and drilling activities [subject to site-specific adjustment by BLM based on factors such as visual screening and the type, timing, and duration of the proposed action]. Results of the survey shall be submitted to the BLM. Surveys shall be required if 2 years have lapsed between the initial survey and the commencement of new development activities or if changes to the location of planned infrastructure were

made after initial surveys were conducted. Contact Heidi Plank, GJFO Wildlife Biologist, at 970-244-3012 or heidi_plank@blm.gov.

Controlled Surface Use to Protect Fragile Soils. To maintain soil productivity, prevent accelerated soil erosion, and protect water quality and quantity, before construction or other surface disturbance, a site-specific plan of development demonstrating performance objectives and standards must be submitted and approved by the BLM.

Access. Public access on existing BLM roads shall be maintained at all times.

Range Improvement Structure. Any damage to water collection structure or buried pipeline associated with it needs to be repaired immediately, and the Grand Junction Field Office notified. Bob Fowler, 970-244-3017.

Construction. Round southwest pad corner 6 to minimize cut and excess materials.

K29OU:

60-Day Big Game Winter Range Timing Limitation. To protect crucial big game winter range on leases without timing restrictions, construction and drilling activities are prohibited from January 1 through February 28. Field review and the updated Colorado Division of Wildlife Big Game Winter Habitat mapping clearly identify the well location and access road within these crucial winter ranges.

Nesting Raptors Timing Limitation. To protect nesting raptors, a survey shall be conducted prior to well pad construction or the initiation of drilling activities during the raptor nesting season (February 1 to August 15). The survey shall include all potential nesting habitat within 0.5 mile of a well pad or 0.25 mile of an access road, pipeline, or other surface facility. If an active raptor nest is located within the buffer widths specified above, a 60-day Timing Limitation (TL) shall be applied to prohibit initiation of construction and drilling activities [subject to site-specific adjustment by BLM based on factors such as visual screening and the type, timing, and duration of the proposed action]. Results of the survey shall be submitted to the BLM. Surveys shall be required if 2 years have lapsed between the initial survey and the commencement of new development activities or if changes to the location of planned infrastructure were made after initial surveys were conducted. Contact Heidi Plank, GJFO Wildlife Biologist, at 970-244-3012 or heidi_plank@blm.gov.

Controlled Surface Use to Protect Fragile Soils. To maintain soil productivity, prevent accelerated soil erosion, and protect water quality and quantity, before construction or other surface disturbance, a site-specific plan of development demonstrating performance objectives and standards must be submitted and approved by the BLM.

Visual Resource Management (VRM). All structures, including but not limited to storage tanks, meter houses, de-hydrators, and the well head, shall be designed to be as low-profile as possible. Tanks used for storage of produced water and condensate shall be no taller than 15 feet and shall be set below ground level if necessary to meet visual objectives.

Cut and fill slopes shall be constructed at a slope of 2.5:1 and hydro-mulch seeded, to reduce impacts to soils and visual resources. Brush, rock and trees, excluding pinyon pines, shall be scattered at toe of fill.

G30OU:

60-Day Big Game Winter Range Timing Limitation. To protect crucial big game winter range on leases

without timing restrictions, construction and drilling activities are prohibited from January 1 through February 28. Field review and the updated Colorado Division of Wildlife Big Game Winter Habitat mapping clearly identify the well location and access road within these crucial winter ranges.

Nesting Raptors Timing Limitation. To protect nesting raptors, a survey shall be conducted prior to well pad construction or the initiation of drilling activities during the raptor nesting season (February 1 to August 15). The survey shall include all potential nesting habitat within 0.5 mile of a well pad or 0.25 mile of an access road, pipeline, or other surface facility. If an active raptor nest is located within the buffer widths specified above, a 60-day Timing Limitation (TL) shall be applied to prohibit initiation of construction and drilling activities [subject to site-specific adjustment by BLM based on factors such as visual screening and the type, timing, and duration of the proposed action]. Results of the survey shall be submitted to the BLM. Surveys shall be required if 2 years have lapsed between the initial survey and the commencement of new development activities or if changes to the location of planned infrastructure were made after initial surveys were conducted. Contact Heidi Plank, GJFO Wildlife Biologist, at 970-244-3012 or heidi_plank@blm.gov.

Controlled Surface Use to Protect Fragile Soils. To maintain soil productivity, prevent accelerated soil erosion, and protect water quality and quantity, before construction or other surface disturbance, a site-specific plan of development demonstrating performance objectives and standards must be submitted and approved by the BLM.

Access. Access shall be from the south east, via Mesa County Road T.00 and the Moffat Gulch Road (BLM 7800), not from the northwest via the unimproved section of Moffat Gulch (BLM 7800), as proposed.

Pre-Construction Inspection. To ascertain that cuts and fills are minimized, as discussed at the onsite inspection, a pre-construction onsite shall be held before construction or other surface disturbance. At the onsite, BLM directed EnCana to reduce cut from 9.0 to 3.0 feet, raising the pad grade and minimizing fill and excess material of 18,200 yd^2. The revised plat shows new cut of 6.5 feet and excess of 5000 yd^2. BLM would like to see the pad balanced by further reducing cut at center. The meeting shall include personnel from the BLM and EnCana, including construction, survey and other appropriate staff. Can

Construction. Round corner 8 at NNW, to limit disturbance.

J31OU:

Monitoring of Special Status Species Populations. Before construction or other surface disturbance, EnCana shall provide an approved biologist to conduct a vegetation survey during the growing season, in all areas where special status species occur within 200 meters of ground disturbing activities. (These areas are identified in the Special Status Species section of the OMDP EA). Further, follow-up surveys shall be conducted at least once annually.

The first report shall contain photographs of all special status species locations within 200 meters of the project area. They shall be photographed one month before pipeline**,** road, and/or pad construction and within one month after the pipeline, road, and/or pad is constructed. Annual reports will be required through the production and final reclamation phases of development, unless waived by the BLM.

Surveys shall include vegetation present, descriptions of species and life forms, and shall describe the state of the special status species and habitat. The report shall also include a narrative of whether impacts, specifically, but not limited to dust, weeds, OHV use, erosion and sedimentation are affecting the special

status species. New photos of each special status species location shall be taken at the times of survey and included with the report, to be submitted to the GSFO and GJFO no later than December 1, annually.

Controlled Surface Use to Protect Fragile Soils. To maintain soil productivity, prevent accelerated soil erosion, and protect water quality and quantity, before construction or other surface disturbance, a site-specific plan of development demonstrating performance objectives and standards must be submitted and approved by the BLM.

60-Day Big Game Winter Range Timing Limitation. To protect crucial big game winter range on leases without timing restrictions, construction and drilling activities are prohibited from January 1 through February 28. Field review and the updated Colorado Division of Wildlife Big Game Winter Habitat mapping clearly identify the well location and access road within these crucial winter ranges.

Nesting Raptors Timing Limitation. To protect nesting raptors, a survey shall be conducted prior to well pad construction or the initiation of drilling activities during the raptor nesting season (February 1 to August 15). The survey shall include all potential nesting habitat within 0.5 mile of a well pad or 0.25 mile of an access road, pipeline, or other surface facility. If an active raptor nest is located within the buffer widths specified above, a 60-day Timing Limitation (TL) shall be applied to prohibit initiation of construction and drilling activities [subject to site-specific adjustment by BLM based on factors such as visual screening and the type, timing, and duration of the proposed action]. Results of the survey shall be submitted to the BLM. Surveys shall be required if 2 years have lapsed between the initial survey and the commencement of new development activities or if changes to the location of planned infrastructure were made after initial surveys were conducted. Contact Heidi Plank, GJFO Wildlife Biologist, at 970-244-3012 or heidi_plank@blm.gov.

F32OU:

Monitoring of Special Status Species Populations. EnCana shall provide an approved biologist to conduct a vegetation survey during the growing season, in all areas where special status species occur within 200 meters of ground disturbing activities. (These areas are identified in the Special Status Species section of the OMDP EA). Further, follow-up surveys shall be conducted at least once annually.

The first report shall contain photographs of all special status species locations within 200 meters of the project area. They shall be photographed one month before pipeline**,** road, and/or pad construction and within one month after the pipeline, road, and/or pad is constructed. Annual reports will be required through the production and final reclamation phases of development, unless waived by the BLM. Surveys shall include vegetation present, descriptions of species and life forms, and shall describe the state of the special status species and habitat. The report shall also include a narrative of whether impacts, specifically, but not limited to dust, weeds, OHV use, erosion and sedimentation are affecting the special status species. New photos of each special status species location shall be taken at the times of survey and included with the report, to be submitted to the GSFO and GJFO no later than December 1, annually.

D33OU:

Monitoring of Special Status Species Populations. Before construction or other surface disturbance, EnCana shall provide an approved biologist to conduct a vegetation survey during the growing season, in all areas where special status species occur within 200 meters of ground disturbing activities. (These areas are identified in the Special Status Species section of the OMDP EA). Further, follow-up surveys shall be conducted at least once annually.

The first report shall contain photographs of all special status species locations within 200 meters of the project area. They shall be photographed one month before pipeline**,** road, and/or pad construction and within one month after the pipeline, road, and/or pad is constructed. Annual reports will be required through the production and final reclamation phases of development, unless waived by the BLM. Surveys shall include vegetation present, descriptions of species and life forms, and shall describe the state of the special status species and habitat. The report shall also include a narrative of whether impacts, specifically, but not limited to dust, weeds, OHV use, erosion and sedimentation are affecting the special status species. New photos of each special status species location shall be taken at the times of survey and included with the report, to be submitted to the GSFO and GJFO no later than December 1, annually.

Controlled Surface Use to Protect Fragile Soils. To maintain soil productivity, prevent accelerated soil erosion, and protect water quality and quantity, before construction or other surface disturbance, a site-specific plan of development demonstrating performance objectives and standards must be submitted and approved by the BLM.

60-Day Big Game Winter Range Timing Limitation. To protect crucial big game winter range on leases without timing restrictions, construction and drilling activities are prohibited from January 1 through February 28. Field review and the updated Colorado Division of Wildlife Big Game Winter Habitat mapping clearly identify the well location and access road within these crucial winter ranges.

Nesting Raptors Timing Limitation. To protect nesting raptors, a survey shall be conducted prior to well pad construction or the initiation of drilling activities during the raptor nesting season (February 1 to August 15). The survey shall include all potential nesting habitat within 0.5 mile of a well pad or 0.25 mile of an access road, pipeline, or other surface facility. If an active raptor nest is located within the buffer widths specified above, a 60-day Timing Limitation (TL) shall be applied to prohibit initiation of construction and drilling activities [subject to site-specific adjustment by BLM based on factors such as visual screening and the type, timing, and duration of the proposed action]. Results of the survey shall be submitted to the BLM. Surveys shall be required if 2 years have lapsed between the initial survey and the commencement of new development activities or if changes to the location of planned infrastructure were made after initial surveys were conducted. Contact Heidi Plank, GJFO Wildlife Biologist, at 970-244-3012 or heidi_plank@blm.gov.

OM35:

Cultural Data Recovery. To protect a cultural site eligible for the National Register, before construction or other surface disturbance occurs, the operator shall submit a data recovery proposal for approval by the BLM archaeologist and the State Historic Preservation Office.

Controlled Surface Use to Protect Fragile Soils. To maintain soil productivity, prevent accelerated soil erosion, and protect water quality and quantity, before construction or other surface disturbance, a site-specific plan of development demonstrating performance objectives and standards must be submitted and approved by the BLM.

Paleontological Resources. Before disturbance, an inventory of fossil resources in Class I and II paleontological areas must be performed by an accredited paleontologist approved by the Authorized Officer.

Pre-Construction Inspection. A pre-construction onsite shall be held to ascertain that the location is constructed to minimize impacts to multiple resources. The meeting shall include personnel from the BLM and EnCana, including construction, stormwater, reclamation, survey, ecology, wildlife, archaeology, and other appropriate staff.

Monitoring of Special Status Species Populations. Before construction or other surface disturbance, EnCana shall provide an approved biologist to conduct a vegetation survey during the growing season, in all areas where special status species occur within 200 meters of ground disturbing activities. (These areas are identified in the Special Status Species section of the OMDP EA). Further, follow-up surveys shall be conducted at least once annually.

The first report shall contain photographs of all special status species locations within 200 meters of the project area. They shall be photographed one month before pipeline**,** road, and/or pad construction and within one month after the pipeline, road, and/or pad is constructed. Annual reports will be required through the production and final reclamation phases of development, unless waived by the BLM. Surveys shall include vegetation present, descriptions of species and life forms, and shall describe the state of the special status species and habitat. The report shall also include a narrative of whether impacts, specifically, but not limited to dust, weeds, OHV use, erosion and sedimentation are affecting the special status species. New photos of each special status species location shall be taken at the times of survey and included with the report, to be submitted to the GSFO and GJFO no later than December 1, annually.

DeBeque Milkvetch Protection. The proposed road/pipeline to OM35 should be re-routed to the existing road located downslope and to the west. If this is not possible, and the proposed road/pipeline to OM35 is not denied, then EnCana shall minimize the road disturbance width within the DeBeque milkvetch population by constructing retaining walls and by hauling all excavated fill material to an approved disposal site. In addition, the DeBeque milkvetch population within the road alignment will be fenced, to the extent possible, with orange mesh construction fencing prior to ground-disturbing activities associated with the proposed OM35 road. EnCana shall provide an approved biologist to flag the location of the fence and monitor the fence installation and all road construction, to ensure there is no inadvertent damage to the DeBeque milkvetch.

Adobe Thistle Protection. The waste material pile for OM35 will be relocated away from the adobe thistle population adjacent to the pad. Additionally, the entire adobe thistle population will be fenced with orange mesh construction fencing prior to ground-disturbing activities associated with the proposed OM35 pad. EnCana shall provide an approved biologist to flag the location of the fence and monitor the fence installation and all construction to ensure there is no inadvertent damage to the adobe thistle. Additionally, EnCana shall install a sediment retention fence between pad disturbance and the Adobe thistle population, to ensure that no indirect impacts accrue from erosion or sedimentation. If the entire adobe thistle population cannot be avoided, seeds will be collected and redistributed into the surrounding area after construction, to mitigate the loss of adobe thistle.

60-Day Big Game Winter Range Timing Limitation. To protect crucial big game winter range on leases without timing restrictions, construction and drilling activities are prohibited from January 1 through February 28. Field review and the updated Colorado Division of Wildlife Big Game Winter Habitat mapping clearly identify the well location and access road within these crucial winter ranges.

Raptor Nesting. Raptor nest surveys conducted in 2006 within the project vicinity resulted in the location of one nest structure within 0.25 miles of the OM35 pad and access road and one nest within 0.3 mile of the G30 pad. Surveys shall be required if 2 years have lapsed between the initial survey and the commencement of new development activities or if changes to the location of planned infrastructure were made after initial surveys were conducted.

To protect nesting raptors, a survey shall be conducted prior to well pad construction or the initiation of drilling activities during the raptor nesting season (February 1 to August 15). The survey shall include all potential nesting habitat within 0.5 mile of a well pad or 0.25 mile of an access road, pipeline, or other

surface facility. If an active raptor nest is located within the buffer widths specified above, a 60-day Timing Limitation (TL) shall be applied to prohibit initiation of construction and drilling activities [subject to site-specific adjustment by BLM based on factors such as visual screening and the type, timing, and duration of the proposed action]. Results of the survey shall be submitted to the BLM. Contact Heidi Plank, GJFO Wildlife Biologist, at 970-244-3012 or heidi_plank@blm.gov.

Visual Resource Management (VRM). To limit changes in the observable character of the landscape, as many trees as possible shall be retained, especially near Corner 8, at the north-northwest, and along the north edge of the pad, to screen the view of the site from the I-70 highway corridor.

To mitigate impacts to visual resources within a highway corridor, side-cast of materials shall be strictly minimized within view of Interstate 70, along the access road and at Pad Corner 8. Excavated fill material shall be hauled to an approved disposal site. Cuts and fills may require adaptive management beyond immediate seeding required by Standard COAs.

To create a more natural looking landscape in areas of visual sensitivity and to control erosion and enhance vegetative establishment, soil materials re-placed on cut-and-fill slopes shall be pocked/pitted with small depressions to form micro-basins, in a "fish scale" pattern constructed perpendicular to the natural flow of water and/or prevailing wind. Such slopes (on pad, access road, and/or pipeline) shall be uniformly covered with the depressions, then seeded as directed by the BLM.

Brush, rock and trees, excluding pinyon pines, shall be scattered at toe of fill to mitigate visual impacts.

All structures, including but not limited to storage tanks, meter houses, de-hydrators, and the well head, shall be designed to be as low-profile as possible. Tanks used for storage of produced water and condensate shall be no taller than 15 feet and shall be set below ground level if necessary to meet visual objectives.

OM36:

Additional Special Status Plant Survey Required. The proposed pipeline route northwest of OM36 will be surveyed for special status plant species prior to any construction activities associated with the proposed pipeline.

Monitoring and Protection of Special Status Species Populations. EnCana shall provide an approved biologist to conduct surveys as necessary to determine the presence/absence of midget faded rattlesnakes within 200 meters of ground disturbing activities. The survey shall occur using the best available scientific or commercial survey techniques including but not limited to radio-telemetry. Surveys should begin in the fall of 2008, with surveys again in the fall of 2009 if a den or hibernacula are not located in 2008. No surface disturbance shall occur within 200 meters of any den or hibernacula.

DeBeque Milkvetch Protection. Proposed pad OM36 shall be moved 200 meters to the east if possible or the entire DeBeque milkvetch population adjacent to proposed pad OM36 will be fenced with orange mesh construction fencing prior to ground-disturbing activities associated with the proposed OM36 pad. EnCana shall provide an approved biologist to flag the location of the fence and monitor the fence installation and all construction activities, to ensure there is no inadvertent damage to the DeBeque milkvetch. Additionally, EnCana shall install a sediment retention fence directly above the fenced DeBeque milkvetch population to ensure there are no indirect impacts from erosion or sedimentation.

60-Day Big Game Winter Range Timing Limitation. To protect crucial big game winter range on leases without timing restrictions, construction and drilling activities are prohibited from January 1 through

February 28. Field review and the updated Colorado Division of Wildlife Big Game Winter Habitat mapping clearly identify the well location and access road within these crucial winter ranges.

Nesting Raptors Timing Limitation. To protect nesting raptors, a survey shall be conducted prior to well pad construction or the initiation of drilling activities during the raptor nesting season (February 1 to August 15). The survey shall include all potential nesting habitat within 0.5 mile of a well pad or 0.25 mile of an access road, pipeline, or other surface facility. If an active raptor nest is located within the buffer widths specified above, a 60-day Timing Limitation (TL) shall be applied to prohibit initiation of construction and drilling activities [subject to site-specific adjustment by BLM based on factors such as visual screening and the type, timing, and duration of the proposed action]. Results of the survey shall be submitted to the BLM. Surveys shall be required if 2 years have lapsed between the initial survey and the commencement of new development activities or if changes to the location of planned infrastructure were made after initial surveys were conducted. Contact Heidi Plank, GJFO Wildlife Biologist, at 970-244-3012 or heidi_plank@blm.gov.

Controlled Surface Use to Protect Steep Slopes. To maintain soil productivity, prevent accelerated soil erosion, and protect water quality and quantity, before construction or other surface disturbance on slopes over 30%, a site-specific plan of development demonstrating performance objectives and standards must be submitted and approved by the BLM.

Pre-Construction Inspection. A pre-construction onsite shall be held to ascertain that the location is constructed to minimize impacts to multiple resources. The meeting shall include personnel from the BLM and EnCana, including construction, stormwater, reclamation, ecology, archaeology, and other appropriate staff.

Monitoring of Special Status Species Populations. Before construction or other surface disturbance, EnCana shall provide an approved biologist to conduct a vegetation survey during the growing season, in all areas where special status species occur within 200 meters of ground disturbing activities. (These areas are identified in the Special Status Species section of the OMDP EA). Further, follow-up surveys shall be conducted at least once annually.

The first report shall contain photographs of all special status species locations within 200 meters of the project area. They shall be photographed one month before pipeline**,** road, and/or pad construction and within one month after the pipeline, road, and/or pad is constructed. Annual reports will be required through the production and final reclamation phases of development, unless waived by the BLM. Surveys shall include vegetation present, descriptions of species and life forms, and shall describe the state of the special status species and habitat. The report shall also include a narrative of whether impacts, specifically, but not limited to dust, weeds, OHV use, erosion and sedimentation are affecting the special status species. New photos of each special status species location shall be taken at the times of survey and included with the report, to be submitted to the GSFO and GJFO no later than December 1, annually.

Visual Resource Management (VRM). If mitigation for VRM impacts is not possible, then NSO will be required.

To limit changes in the observable character of the landscape, as many trees as possible shall be retained, especially near Corner 8, to the southwest, and along the western and northern edges of the pad, to screen the view of the site from the I-70 highway corridor.

Side-cast of materials shall be strictly minimized within view of I-70. Excavated fill material shall be hauled to an approved disposal site. Cuts and fills may require adaptive management beyond immediate seeding required by Standard COAs.

To create a more natural looking landscape in areas of visual sensitivity and to control erosion and enhance vegetative establishment, soil materials re-placed on cut-and-fill slopes shall be pocked/pitted with small depressions to form micro-basins, in a "fish scale" pattern constructed perpendicular to the natural flow of water and/or prevailing wind. Such slopes (on pad, access road, and/or pipeline) shall be uniformly covered with the depressions, then seeded as directed by the BLM.

Brush, rock and trees, excluding pinyon pines, shall be scattered at toe of fill, especially at Corner 8, to mitigate visual impacts.

All structures, including but not limited to storage tanks, meter houses, de-hydrators, and the well head, shall be designed to be as low-profile as possible. Tanks used for storage of produced water and condensate shall be no taller than 15 feet and shall be set below ground level if necessary to meet visual objectives.

Construction. To minimize visual impacts in a highway corridor, Corner 8 shall be cut or rounded to limit fill slope height to 15 feet.

A Stormwater Management Plan that includes a deep trench and sediment reservoirs at downhill side of pad and at corners 2 and 8 shall be developed and submitted to the BLM before construction. All topsoil shall be windrowed at the north and south ends of the pad.
Facilities Layout. Production facilities are not approved as proposed, but shall be located and arranged to facilitate safety and minimize long-term surface disturbance. Pit and storage tank locations shall be reviewed by BLM and EnCana at the time of APD submission, to determine final layout of facilities.

Downhole – Standard Conditions of Approval

NOTIFICATION REQUIREMENTS

Location Construction	-	at least forty-eight (48) hours prior to construction of location and access roads.
Spud Notice	-	at least twenty-four (24) hours prior to spudding the well.
Casing String and Cementing	-	at least twenty-four (24) hours prior to running casing and cementing all casing strings.
BOP and Related Equipment Tests	-	at least twenty-four (24) hours prior to initiating pressure tests.
First Production Notice	-	within five (5) business days after new well begins, or production resumes after well has been off production for more than ninety (90) days.
Reclamation		At least (24) hours prior to reshaping the well pad.

For more specific details on notification requirements, please check the Conditions of Approval for Notice to Drill and Surface Use Program.

REGULATORY REMINDERS

Approval of this application does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease, which would entitle the applicant to conduct operations thereon.

All lease and/or unit operations shall be conducted in such a manner that full compliance is made with applicable laws, regulations (43 CFR 3100), Onshore Oil and Gas Orders, and the approved plan of operations. The operator is fully responsible for the actions of his subcontractors.

A copy of the approved application for permit to drill (APD), including the conditions of approval and accompanying surface use plan shall be furnished to the field representative by the operator to ensure compliance and shall be available to authorized personnel at the drill site whenever active construction or drilling operations are underway.

Fire restrictions may be in effect when location is being constructed and/or when well is being drilled. Contact the appropriate Surface Management Agency for information.

A. DRILLING PROGRAM

All operations, unless otherwise specifically approved in the APD, must be conducted in accordance with Onshore Oil and Gas Order No. 2.

1. Estimated Depth at Which Oil, Gas, Water, or Other Mineral Bearing Zones are Expected to be Encountered

Any usable water zones encountered below the surface casing shall be isolated and or protected by cementing across the zone. The minimum requirement is to cement from 50 feet above to 50 feet below each usable water zone encountered.

If gas is found to be present in the Wasatch formation, then the zone will need to be isolated either by the primary cement job or remedial cementing.

2. Pressure Control Equipment

The BOP and related equipment shall meet the minimum requirements of Onshore Oil and Gas Order No. 2 for equipment and testing requirements, procedures, etc., for a 3M system and individual components shall be operable as designed. Chart recorders shall be used for all pressure tests.

3. Casing Program and Auxiliary Equipment

The surface casing **shall** be cemented back to surface either during the primary cement job or by remedial cementing. Leak-off tests of the casing shoe shall be performed and recorded for all wells.

4. Mud Program and Circulating Medium

Hazardous substances specifically listed by the EPA as a hazardous waste or demonstrating a characteristic of a hazardous waste shall not be used in drilling, testing, or completion operations.

No chromate additives shall be used in the mud system on Federal and Indian lands without prior BLM approval to ensure adequate protection of fresh water aquifers.

5. Coring, Logging and Testing Program

Daily drilling and completion progress reports shall be submitted to the appropriate BLM office on a weekly basis.

All Drill Stem tests (DST) shall be accomplished during daylight hours, unless specific approval to start during other hours is obtained from the AO. However, DSTs may be allowed to continue at night if the test was initiated during daylight hours and the rate of flow is stabilized and if adequate lighting is available (i.e., lighting which is adequate for visibility and vapor proof for safe operations). Packers can be released, but tripping should not begin before daylight unless prior approval is obtained from the AO.

A cement bond log (CBL) shall be run from the production casing shoe to **TOC** and shall be utilized to determine the bond quality for the production casing.

Whether the well is completed as a dry hole or as a producer, "Well Completion and Recompletion Report and Log" (Form 3160-4) shall be submitted not later than 30 days after completion of the well or after completion of operations being performed, in accordance with 43 CFR 3164. **One** copy of all logs, core descriptions, core analyses, well-test data, geologic summaries, sample description, and all other surveys or data obtained and compiled during the drilling, workover, and/or completion operations, shall be filed with Form 3160-4. Samples (cuttings, fluids, and/or gases) shall be submitted when requested by the AO.

6. Notifications of Operations

No location shall be constructed or moved, no well shall be plugged, and no drilling or workover equipment shall be removed from a well to be placed in a suspended status without prior approval of the AO. If operations are to be suspended, prior approval of the AO shall be obtained and notification given before resumption of operations.

The Glenwood Springs Field Office shall be notified, during regular work hours (7:45 a.m.-4:30 p.m., Monday through Friday except holidays), at least 24 hours **prior** to spudding the well.

Operator shall report production data to MMS pursuant to 30 CFR 216.5 using form MMS/3160.

The date on which production is commenced or resumed will be construed for oil wells as the date on which liquid hydrocarbons are first sold or shipped from a temporary storage facility, such as a test tank, and for which a run ticket is required to be generated or, the date on which liquid hydrocarbons are first produced into a permanent storage facility, whichever first occurs; and, for gas wells as the date on which associated liquid hydrocarbons are first sold or shipped from a temporary storage facility, such as a test tank, and for which a run ticket is required to be generated or, the date on which gas is first measured through permanent metering facilities, whichever first occurs.

Should the well be successfully completed for production, the AO shall be notified when the well is placed in a producing status. Such notification shall be sent by telegram or other written communication, not later than five (5) days following the date on which the well is placed on production.
A schematic facilities diagram as required by 43 CFR 3162.7-5 (b.9. d.), and shall be submitted to the appropriate District Office within sixty (60) days of installation or first production, whichever occurs first. All site security regulations as specified in Onshore Oil & Gas Order No. 3 shall be adhered to. All product lines entering and leaving hydrocarbon storage tanks shall be effectively sealed in accordance with 43 CFR 3162.7-5 (b. 4).

No well abandonment operations shall be commenced without the prior approval of the AO. In the case of newly drilled dry holes or failures, and in emergency situations, oral approval shall be obtained from the AO. A "Subsequent Report of Abandonment" Form 3160-5, shall be filed with the AO within thirty (30) days following completion of the well for abandonment. This report shall indicate where plugs were placed and the current status of surface restoration. Final abandonment will not be approved until the surface reclamation work required by the approved APD or approved abandonment notice has been completed to the satisfaction of the AO or his representative, or the appropriate Surface Managing Agency.

7. Other Information

All loading lines shall be placed inside the berm surrounding the tank battery.

All off-lease storage, off-lease measurement, or commingling on-lease or off-lease shall have prior written approval from the AO.

All open-vent exhaust stacks associated with heater-treater, separator, and dehydrator units must be constructed to prevent birds and bats from entering them and to the extent practical to discourage perching and nesting.

The oil and gas measurement facilities shall be installed on the well location. The oil and gas meters shall be calibrated in place prior to any deliveries. Tests for meter accuracy shall be conducted following initial installation and at least quarterly thereafter. The AO shall be provided with a date and time for the initial meter calibration and all future meter-proving schedules. A copy of the meter calibration reports shall be submitted to the appropriate BLM office. All meter measurement facilities shall conform to Onshore Oil & Gas Order No. 4 for liquid hydrocarbons and Onshore Oil & Gas Order No. 5 for natural gas measurement.

The use of materials under BLM jurisdiction shall conform to 43 CFR 3610.2-3.

There shall be no deviation from the proposed drilling and/or workover program without prior approval from the AO. Safe drilling and operating practices must be observed. All wells, whether drilling, producing, suspended, or abandoned shall be identified in accordance with 43 CFR 3162.

"Sundry Notice and Report on Wells" (Form 3160-5) shall be filed for approval for all changes of plans and other operations in accordance with 43 CFR 3162.3-2.

Section 102(b)(3) of the Federal Oil and Gas Royalty Management Act of 1982, as implemented by the applicable provisions of the operating regulations at Title 43 CFR 3162.4-1(c), requires that "not later than the 5th business day after any well begins production on which royalty is due anywhere on a lease site or allocated to a lease site, or resumes production in the case of a well which has been off production for more than 90 days, the operator shall notify the authorized officer by letter or sundry notice, Form 3160-5, or orally to be followed by a letter or sundry notice, of the date on which such production has begun or resumed."

If you fail to comply with this requirement in the manner and time allowed, you shall be liable for a civil penalty of up to $10,000 per violation for each day such violation continues, not to exceed a maximum of 20 days. See Section 109(c)(3) of the Federal Oil and Gas Royalty Management Act of 1982 and the implementing regulations at Title 43 CFR 3162.4-1(b)(5)(ii).

In the event after-hours approval or notification is necessary, please contact one of the following:

GJFO (Fax 970-244-3083)

Bob Hartman, Petroleum Engineer	O: 970-947-5221, C: 970-319-5837
Carol Snyder, Petroleum Engineering Technician	O: 970-947-5213, C: 970-319-2509
Ed Fancher, Petroleum Engineering Technician	O: 970-947-5213, C:970-319-2509
Julia Christiansen, Natural Resource Specialist	O: 970-244-3093

GSEO (Fax 970-947-5267)

Dane Geyer, Petroleum Engineer	O: 970-947-5229, C: 970-589-6887
Jennifer Gallegos, Petroleum Engineering Technician	O: 970-947-5220, C: 970-319-2211
Jim Byers, Natural Resource Specialist	O: 970-947-5222, C: 970-319-2532

APPENDIX G

PUBLIC COMMENTS AND RESPONSES

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PUBLIC COMMENTS AND RESPONSES

Bureau of Reclamation

In their letter to the BLM, the Bureau of Reclamation (BOR) provided the following comments based on their review of EnCana's Proposed Action:

The proposed development plan shows three bottomholes on the DeBeque Wildlife Area (owned by BOR) from proposed well pad F18OU on adjacent BLM lands. The document suggests that these lands are included in Federal lease COC58675. This lease COC58675 does not include BOR's DeBeque Wildlife Area mineral rights. These rights are a mixture of acquired Federal and other private rights. BOR is not aware of any lease being executed for this area and would require proof of lease before allowing development of the mineral rights.

Response: It is correct that the three wells are not planned to have bottomholes in Federal lease COC58675. However, the proposed F18OU pad would be constructed on Federal surface within the Federal lease boundary and be subject to the lease terms stated on that lease, which is why the pad is accordingly listed in Table 2. The wells, however, would reach bottomhole targets within the Orchard Unit, a Federal unit designation, which involves pooling of various mineral owners within the unit boundary shown on Figure 1of Appendix C.

The BOR has not received an application from EnCana for a license agreement to cross BOR lands.

Response: Prior to approval to occupy the F18OU pad to drill the 3 wells outside the Federal lease, BLM would require certification from the operator that an agreement had been obtained from BOR to cross the DeBeque Wildlife Area with road and pipelines. The operator is also required to provide a copy of the surface use plan to the landowner. BOR could attach appropriate mitigation requirements to the license agreement executed with the operator for road construction and pipeline installations, before they occur on BOR property.

Seasonal closures, dust abatement, etc. would need to be identified and implemented prior to approval.

Response: The BLM would enforce BOR's request for seasonal closure (March 15 through August 1) to protect nesting birds by requiring COA on any authorization to drill the wells from the F18OU pad.

The development plan must be revised to better identify the proposed produced water disposal transportation. A combination of truck hauling and a buried pipeline system were identified. However, there was no indication of water pipelines on the maps or which wells would be serviced by truck hauling. Also, there is no indication of anticipated quantity or quality of produced water from the various wells, pipelines or truck haul routes, the location or size of non-well pad ancillary facilities (centralized tank batteries, pump stations, etc.) pipeline maintenance, or spill prevention/containment plans.

Response: Quantities of produced water from the proposed wells are not known until the wells are drilled and put into production. A water pipeline system serving the majority of existing pads is in place, and the use and expansion of that system is addressed by a COA (Appendix D, GJFO No. 27, GSEO 20) developed in part to mitigate impacts from truck traffic. At the time an APD is submitted to the BLM the surface use plan of operations, which must also be provided to the BOR, shall disclose plans for water hauling pipelines,

spill plans, secondary containment measures, etc. Further, BOR may negotiate other conditions of their surface use agreement with the operator.

Directional drilling from the existing well pad G18OU would eliminate the need for well pad F18OU and access across the DeBeque Wildlife Area for both the gas well and pipeline.

Response: The proposed bottomhole targets of the wells planned for the F18OU pad cannot be reached from the existing G18OU pad.

The additional vehicle traffic along V.50 has impacted the DeBeque Wildlife Area. Increased traffic has resulted in significant dust plumes adjacent to V.50 during the summer months. This impacts nesting wildlife and also creates a safety hazard as visibility on the road becomes limited. The use of best management practices (i.e., dust abatement by frequent watering of the roadway) would help mitigate these impacts.

Response: V.50 road is jurisdiction of Mesa County, one condition of approval (Appendix D, GJFO No. 4) is that EnCana must reach agreement with Mesa County and all existing ROW holders to use and maintain V.50 or other permitted uses. Grand Junction COA No. 8 also requires dust abatement. However, BLM will work with the operator to implement a regularly scheduled dust abatement program along the V.50 road, including the segment through the DeBeque Wildlife Area, to reduce impacts to wildlife and visual quality and protect public safety during dry weather periods.

Center for Native Ecosystems

In their letter to the BLM the Center for Native Ecosystems provided the following comments:

Given the magnitude of the proposed project, it is entirely appropriate that the Bureau of Land Management (BLM) require review of a master development plan, and we are glad to see this opportunity is being taken. This is one of the appropriate stages in the oil and gas development process for the BLM to consider environmental impacts, especially indirect and cumulative impacts. Cumulative impacts simply cannot be adequately analyzed at the Application for Permit to Drill (APD) stage. It should be noted, however, that the most appropriate stages for the analysis and consideration of cumulative and indirect impacts are the Resource Management Planning stage and the leasing stage, before Federal resources are irretrievably committed.

Response: Thank you for your support with regard to the master development plan requirement. The BLM ordinarily tiers to the cumulative impact analysis presented in our 1999 RMP amendment for individual master development plan. In this case, however, it was considered appropriate to conduct a watershed-based analysis of cumulative impacts specific to this project, because the project area crosses the jurisdictional boundaries of two BLM field offices. In the future, cumulative impact analysis for master development plans on lands administered by the BLM will be tiered to the analysis presented in our revised RMP, which is currently in development.

In general, however, the BLM's authority to require appropriate mitigations for sensitive species, such as relocation of proposed well pads off of occupied habitat, if such provisions are not provided for in the lease stipulations, is extremely limited.

Response: While it is true that the BLM is more limited in requiring appropriate mitigations for sensitive species if lease stipulations are absent, the BLM can still require relocation of pads and roads away from sensitive species occurrences and habitat if

topography allows for these moves. Additionally, one of the objectives of the BLM Special Status Species Policy (BLM 2001) is to ensure that actions requiring authorization and approval by the BLM are consistent with the conservation needs of special status species and do not contribute to the need to list any special status species. If a proposed development will directly impact a large special status species population, and this loss may contribute to the need to list a special status species under the provisions of the ESA, the BLM may choose not to approve the proposed activity.

This scenario exists for the OM35 proposed pad and road (See Special Status Species Section – Environmental Consequences for Federally Listed, Proposed, or Candidate Plant Species and BLM Sensitive Plant Species). The ecologist determined that developing the proposed road and pad as proposed may contribute to the need to list both DeBeque milkvetch and DeBeque phacelia because 900 DeBeque milkvetch plants would be lost, and 0.7 acres of DeBeque phacelia habitat would be lost.

Such Geographic Area-level or field development-level reviews allow the BLM to determine how, within the existing lease terms and consistent with the Resource Management Plan, appropriate mitigations can be applied to the project in the most comprehensive and effective way possible. We therefore encourage the BLM to continue requiring such GAP planning or master development plans for all multi-pad development scenarios, as opposed to allowing large-scale field development to occur via a series of individual APDs.

GSEO Response: We appreciate your encouragement with regard to the master development plan (MDP or GAP) requirement. In conformance with the GSFO 1999 RMP amendment, we will continue to require operators to submit plans that describe a minimum of 2 to three years activity for operator-controlled Federal leases.

GJFO Response: Onshore Oil and Gas Order No. 1, effective May, 2007, established a new approval process for Master Development Plans (MDP). Operators are required to submit plans for field development of a multiple well program. Since the entire MDP proposal can be addressed in a single NEPA analysis, cumulative effects are considered early in proposal and mitigation planning. This affords BLM and the proponent "win-win" opportunities for broad application of identified mitigation measures, minimizing adverse environmental impacts while helping to streamline subsequent permitting.

DeBeque phacelia (*Phacelia submutica*), a candidate for Endangered Species Act protection, is found in the project area, with specific occurrences directly in the path of proposed new wells, roads, and pipelines at the head of Moffat Gulch (near and on pad K29OU on the project map) and at the head of Little Horsethief Creek (near and at pad ON6 on the project map). The Environmental Assessment (EA) for the first stage of EnCana's development of this area (Orchard I GAP, EA #CO140-05-113) identifies the area as supporting DeBeque phacelia (p. 39). This is consistent with the Element Occurrence Records of the Colorado Natural Heritage Program, which place DeBeque phacelia as growing in the exact locations of, or at least immediately adjacent to, some of the proposed wells and well pads in Moffat Gulch and Little Horsethief Creek drainage. In addition, the Orchard I EA acknowledges that habitat for the DeBeque milkvetch, whether currently occupied or not, occurs "throughout the southern portion of the Project Area," which is roughly consistent with the Project Area for the Orchard II proposal.

Response: DeBeque phacelia will not be directly impacted by proposed pad K29OU or proposed pad ON6. The closest known DeBeque phacelia population to proposed pad

K29OU is approximately 1,290 feet away. The closest DeBeque phacelia populations to proposed pad ON6 range from approximately 738 feet to 2,268 feet away. However, there are 0.7 acres of potential DeBeque phacelia habitat that would be directly impacted by the proposed road to OM35, and multiple other populations of DeBeque phacelia within the OMDP that would be indirectly impacted by proposed development actions. See the Special Status Species section for more information on effects to and mitigation measures for DeBeque phacelia.

Careful consideration must be given to how to protect these DeBeque phacelia occurrences through modifications to the project master plan especially because the lease stipulations for the relevant parcels may not be sufficient. In fact, of the two leases encompassing proposed well pads which are certain to affect occupied habitat for the DeBeque phacelia, one (COC58676) includes only a limited Controlled Surface Use stipulation designed to protect fragile soils as well as a general notice that a botanical inventory and mitigative measures *may* be required. The other lease was not purchased as of the publication of the project proposal, so its stipulations are unknown. This means that the approval of the project master plan is likely the last best opportunity for the BLM to adequately influence the design of the project to ensure protection of these plant occurrences.

GSEO Response: Because DeBeque phacelia is not located near proposed ground-disturbing activities in lease COC58676, those lease stipulations are not relevant to DeBeque phacelia. Lease stipulations would be relevant in those leases where DeBeque phacelia populations and potential habitat will be directly and indirectly impacted by the proposed action; however, none of the leases where DeBeque phacelia occurs within 600 feet of ground-disturbing activities contain stipulations for special status plant species, beyond the standard Lease Notice for biological inventories.

GJFO Response: As the pad for the ON6 is located on surface unattached to a Federal lease, a BLM Right-of-way grant will be issued for surface use in that area when a pad is proposed by NOS or APD. Bottom-hole locations proposed for drilling from the ON6 pad would be located in three Federal leases whose surfaces would not be affected, but whose stipulations and resource values may indicate similar values for the ON6 pad location. Based on surveyed resource values and stipulations, Standard and site-specific Surface Conditions of Approval will include regular biological, weed, reclamation and stormwater (for soil erosion/retention) monitoring. Therefore, the mitigations applied through Standard and Site-Specific Conditions of Approval to protect DeBeque phacelia in the OMDP (See the Special Status Species section for more details) are indeed the best opportunity for the BLM to influence the project design to ensure protection for the DeBeque phacelia.

The Orchard I EA (p. 41) provides a partial summary of the type of impacts that are possible for DeBeque phacelia from this project:

Direct impacts could result from placement of roads, pads, and pipelines in potential habitat of this species. Indirect impacts to DeBeque phacelia habitat could result from noxious weed invasion following surface disturbing activities. Noxious weeds tend to be aggressive and develop dense stands that outcompete native species. Indirect impacts to the habitat of DeBeque phacelia also may result from increased public access to the area following construction of new roads and improvement of existing roads. Damage to its habitat may occur if OHVs diverge from the roads and travel cross-country through open hillsides and benches. Since this area is currently designated "open" for cross-country travel in the 1984 GSRA RMP (BLM 1984), the Proposed Action may result in negative impacts to DeBeque phacelia habitat.

This list is incomplete in at least two significant ways. First, DeBeque phacelia often occurs on steep, unstable slopes, and surface disturbing activities, such as road or pipeline building, that occurs adjacent to such habitat may also destabilize such slopes and lead to damage to DeBeque phacelia populations. While well pads and access roads are often sited to avoid steep slopes, they can easily end up sited above or below such slopes, while pipelines are frequently allowed to run directly over steep slopes. The 2005 petition to list the DeBeque phacelia as an endangered species (which is both attached and incorporated by reference) provides more detail regarding the species' preferred habitat conditions and the types of indirect impacts that can stem from oil and gas development near such habitat.

> **Response**: All known and potential DeBeque phacelia habitat within the OMDP will be avoided by at least 200 feet if the access road to proposed pad OM35 is relocated downhill and to the west or if the OM35 pad and road are denied. While DeBeque phacelia will not be directly impacted, there are numerous potential indirect effects such as increases in dust, weed invasion, OHV use, erosion and sedimentation, and a decrease in pollinators and their habitat. Because DeBeque phacelia populations are more than 200 feet away from ground-disturbing activities, there are no foreseen erosion or sedimentation impacts expected. However, monitoring will be required of all special status plant populations within 600 feet of ground-disturbing activities. If erosion and sedimentation due to ground-disturbing activities above DeBeque phacelia populations are found to be affecting DeBeque phacelia, installation of sediment fencing above the affected population will be required. See Special Status Species section for more details.

DeBeque phacelia is an annual plant with large variation in how many individuals come up in a given season. This variation seems to be somewhat moisture dependent and part of a strategy for surviving drought years (again, see the attached listing petition for more information about the DeBeque phacelia's life cycle and biology). In order to achieve this variation, the species relies on a healthy bank of seeds in the soil. One implication of this state of affairs is that areas of seemingly suitable habitat that appear unoccupied during a survey conducted one season may in fact contain seeds that are currently dormant and will sprout in another year. This can lead to inaccurate survey results. If surveys are conducted once, as is almost always the case, they may well misidentify occupied habitat. Therefore, one additional potential impact to DeBeque phacelia is the omission of some of its occupied habitat from consideration for mitigation during the surveying stage of a development project like this one. This could, of course, lead to the destruction of individual plants or even entire occurrences.

> **Response**: It is the policy of the GSFO and GJFO that all potential habitat for DeBeque phacelia, as well as historically or presently occupied DeBeque phacelia habitat, is identified and mapped when special status plant surveys are conducted prior to proposed development activities. If potential habitat is found, but there is no DeBeque phacelia present, that habitat would be considered occupied. Additionally, all areas known to be occupied at one time by DeBeque phacelia are considered occupied. DeBeque phacelia is currently a candidate for listing as threatened or endangered under the provisions of the Endangered Species Act. Additionally, this species is likely to be reviewed for listing by the USFWS in the near future and there is a very real possibility that this species will be listed given the immediate threats of oil and gas development and OHV use. Because of this, all potential and occupied DeBeque phacelia habitat in the OMDP will be avoided by at least 200 feet, if the access road to proposed pad OM35 is relocated downhill and to the

west or if the OM35 pad and road are dropped from the proposed action. See Special Status Species section for more details.

DeBeque milkvetch (*Astragalus debequaeus*), a BLM Sensitive Species which has been petitioned for Endangered Species Act listing in the past, also occurs in the project area. The Orchard I EA notes that two occurrences of the species were found along Horsethief Creek during surveys in 2004 (CO140-05-113 EA at 41). The EA provides the same summary of potential impacts to the DeBeque milkvetch as to the DeBeque phacelia (excerpted above). The 2004 petition to list the DeBeque milkvetch as an endangered species (which is both attached and incorporated by reference) provides more detail regarding the species' preferred habitat conditions and the types of indirect impacts that can stem from oil and gas development near such habitat.

Response: A large population of DeBeque milkvetch (approximately 900 individuals) was found on the proposed access road to OM35. Two other populations were found in the vicinity of proposed pad OM36. The larger of these consists of approximately 200 plants and is located 100 feet from a corner of the proposed pad. The smaller population near the proposed OM36 pad is 490 feet from the pad.

Mitigations such as denying or relocating proposed pad OM35 and associated access road are included in the Special Status Species section. Also, mitigations such as relocating proposed pad OM36 and fencing and monitoring the DeBeque milkvetch population within 100 feet of proposed pad OM36 are included. The current proposed action would result in an unacceptable loss of approximately 900 DeBeque milkvetch plants from the proposed access road to pad OM35. One of the objectives of BLM special status species policy (BLM 2001) is to ensure that actions requiring authorization and approval by the BLM are consistent with the conservation needs of special status species and do not contribute to the need to list any special status species. DeBeque milkvetch was petitioned for listing under the Endangered Species Act in 2004 (CNE & CoNPS 2004). The petition was determined by the USFWS to be "not warranted" due to lack of substantial or commercial information indicating listing was warranted (USFWS 2007a). It is the opinion of the GSEO Ecologist that the proposed action (specifically proposed pad OM35 and associated access road) may contribute to the need to list the DeBeque milkvetch under the provisions of the ESA.

DeBeque milkvetch will not be directly impacted if the road to OM35 and proposed pad 35 are relocated or denied. However, there would still be indirect impacts to those DeBeque milkvetch populations within 100 and 490 feet of proposed pad OM36. These indirect effects could include increases in dust, weed invasion, OHV use, erosion, and sedimentation, and a decrease in pollinators and their habitat. Because a population of DeBeque milkvetch occurs 100 feet below proposed pad OM36, there is the very real concern that erosion or sedimentation could affect this population. Therefore, a site-specific COA for OM36 will require fencing of that population along with the installation of a sediment fence above that population. Additionally, monitoring will be required of all special status plant populations within 600 feet of ground-disturbing activities. If erosion and sedimentation due to ground-disturbing activities above DeBeque milkvetch populations are found to be affecting DeBeque milkvetch, installation of sediment fencing above the affected population will be required. See Special Status Species section for more details

The Orchard I EA indicated that, while the species had been previously identified in the area, a specific survey of most of the areas affected by the Orchard I project did not reveal occurrences of the Uinta Basin hookless cactus "that could be impacted by the proposed access roads, pipelines and well pads" (p. 40). This suggests, however, that there are Uinta Basin hookless cactus occurrences in the Orchard I project area, just not in locations that could have been impacted directly by the proposed infrastructure. Since the Orchard II proposed project will impact much the same area, there is every chance that it will affect Uinta Basin hookless cactus occurrences. In addition to the specific occurrences, the Orchard I EA acknowledges that "habitat for the Uinta Basin hookless cactus occurs within the Project Area" (p. 41).

> **Response:** During surveys conducted in the OMDP, potential habitat was identified in the vicinity of proposed pad F18OU and the associated access road. The results of the rare plant survey for the OMDP project area (WER 2008), in combination with data from previous surveys and the CNHP, revealed the presence of one individual Colorado hookless cactus (*Sclerocactus glaucus*), approximately 850 feet from the edge of the proposed F18OU pad and 600 feet from the proposed access road to F18OU.
>
> Additionally, a proposed pipeline route from F18OU to G18OU has not been surveyed and may contain habitat for the Colorado hookless cactus. If this pipeline route follows the existing disturbed power line route, then surveys will not be required. However, if there is any proposed ground-disturbance outside of the existing power line disturbance, then additional Colorado hookless cactus surveys will be required before construction of the pipeline begins. A biological assessment was prepared in early 2008 in which the BLM determined that the proposed action's effect determination was one of "may affect but is not likely to adversely affect" the Colorado hookless cactus. The U.S. Fish and Wildlife Service responded with concurrence on July 28, 2008 (Appendix D).

With regard to the South Shale Ridge area immediately to the north of the proposed project area at issue here, the Colorado district court recently found that the BLM failed to consider indirect and cumulative impacts to the Uinta Basin hookless cactus from leases issued adjacent to the species' occupied habitat. In light of this, BLM must be sure to fully analyze the cumulative impacts of this proposed project on this species and all other Special Status Species.

> **Response**: We agree with this. Please see the Special Status Species Environmental Consequences section for the indirect impact analysis. Please see the **Cumulative Impacts Analysis** section of this EA for additional information.

The Orchard I EA identifies several mitigation measures intended to protect all the Special Status plant species in the project area. These include botanical surveys of all potential disturbance areas, relocating activities and facilities to avoid direct impact, controlling noxious weeds, reseeding during well pad reclamation with native seed, and gating one access road in the Project Area to discourage off-road vehicle trampling on nearby slopes. While these same mitigation measures should certainly be adopted as a minimum in the EA for the Orchard II project, they alone are insufficient for several reasons. First, they do not address indirect impacts to plant habitat from the location of facilities and activities. For example, damage to plant habitat can occur from adjacent soil erosion and alteration of surface water drainage. Second, they do not address the cumulative impacts of this proposed project being laid over the existing infrastructure and impacts of the Orchard I project. Much of the threat from noxious weed invasion and increased off-road vehicle access already exists due to the development in the area under the Orchard I plan, but approving the additional layer of development that comes with Orchard II will

dramatically accelerate these threats. Third, they do not address the specific problem of identifying occupied DeBeque phacelia habitat through single surveys.

> **Response**: Please see the Special Status Species Environmental Consequences section for the indirect impact analysis of special status plant species. Indirect impacts from erosion and sedimentation have been addressed in the OMDP. Please see the **Cumulative Impacts Analysis** section of this EA for additional information. The comment concerning identification of occupied DeBeque phacelia habitat through single surveys was addressed in a previous response. While it may be difficult to determine whether or not potential habitat is occupied by DeBeque phacelia, the habitat is easily recognizable. Our policy is to treat all potential habitat as occupied.

Colorado Division of Wildlife

In their letter to the BLM, the Colorado Division of Wildlife provided the following comments: The document represents the second attempt at development in this area. It is concerning to the CDOW that we find ourselves looking at further development within the same area. CDOW and BLM should be looking at the reasonable foreseeable development in the area that is analyzed. The question comes to mind as to why these locations/facilities were not analyzed for the first development?

> **Response**: The Orchard Unit GAP, approved in September 2005, represented the initial 2 years of the drilling program. EnCana had drilled 8 wells under separate NEPA actions prior to the GAP approval, to conduct exploratory drilling and develop a development strategy for the Horsethief Field. By implementing the proposed action analyzed in the 2005 Orchard Unit GAP EA and gaining information on resource development, the operator has presented the OMDP, which portrays an additional 2-3 year drilling plan comprised primarily of in-fill field development, with some exploratory wells planned at the western and southern edges of the OMDP boundary. The 1987 Grand Junction RMP, 1999 Glenwood Springs Oil and Gas Environmental Impact Statement, and 2006 Roan Plateau RMPA/EIS provide the reasonable foreseeable development scenarios. See **Cumulative Impacts Analysis** for additional information.

Wildlife Mitigation is not discussed in the document. It appears that the [GSFO EIS] threshold of four pads per section has been met and will likely require mitigation. Our review of the 1999 EIS suggests that at four pads per section mitigation is required to offset impacts to wildlife. Please advise if our analysis is correct in this regard.

> **GSEO Response**: The document available for public review was the Proposed Action of the Environmental Assessment along with operator-submitted Surface Use Plan, Drilling Plan, and adoption of the BLM Glenwood Springs Energy Office Standard Conditions of Approval. Wildlife impacts and mitigation of those impacts are addressed in the Environmental Assessment for the Orchard II GAP, including a complete Wildlife Mitigation Threshold Analysis. While BLM understands CDOW's desire that mitigation be incorporated into the Proposed Action, the reality is that the type and amount of mitigation typically evolves from the impact analysis. In many cases, the identified mitigation needs are then "retrofitted" into the Proposed Action as part of the EA document.
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> **GJFO Response**: The operator's submission meets the need, set out in Onshore Oil and Gas Order No. 1, for a master plan for field development of a multiple well program. Early mitigation planning is encouraged by the Order and was included in the proposal to

the extent foreseeable by the proponent. The NEPA analysis is designed to identify broad and specific impacts and mitigation measures, as well as cumulative effects, including those to wildlife. Mitigation measures of wildlife and other recognized impacts would necessarily follow analysis results. Please see **Operator Committed Mitigation** for a complete description of EnCana's proposed mitigation.

CDOW encourages maximum use of directional drilling to reduce the number of wells per well pad. Currently only 2-6 wells per pad are proposed. (Reference to Page 2, Paragraph 2)

Response: The proposed number of wells per pad (averaging approximately four) reflects the fact that the Orchard II project is considered exploratory. EnCana's approach to exploratory projects is to define the subsurface resource by drilling wells across the entire area. At some later date—depending on the resource, economics, and technology—EnCana is likely to return to some of the pads to drill additional directional wells. Until the resource is more fully defined, EnCana cannot predict which level of subsequent drilling specific pads may require. For example, note that less than half of the 65 wells analyzed in the 2005 Orchard I project have been drilled to date, yielding an average of 2.13 wells per pad. While BLM agrees with CDOW that clustered directional drilling is generally beneficial, due to reduction of surface impacts, economic and technical conditions do not always make such an approach feasible. BLM does not dictate the operator's approach to exploration or field development, particularly when constraints are not specified in the lease document. The "mitigation threshold," derived from the GSFO 1999 EIS, is intended to encourage clustered, directional drilling.

CDOW would like to be involved early on in the scoping/drafting of the Orchard II EA. Please contact us as soon as possible to schedule a meeting regarding this proposal. Generally, we encourage planning on a larger geographic basis, however, despite this we are concerned about the steady increase in oil and gas development in the area. (Reference to Page 2, Paragraph 3)

GSEO Response: CDOW was included in the scoping process for the OMDP. A meeting was called with CDOW, BLM-GSFO, and BLM-GJFO to discuss comments, mitigation measures, and habitat improvement options. The GAP or MDP process is defined in BLM-GSFO land use plans, providing direction for planning on a geographic scale. Onshore Oil and Gas Order No. 1 also provides planning and processing direction to BLM and Operators. BLM understands that CDOW would like to become involved earlier in the process. BLM will work with CDOW to try and identify an approach for future projects that would accommodate earlier involvement without unnecessarily protracting BLM's NEPA process.

GJFO Response: In response to CDOW's wishes, GJFO now affords CDOW cooperator status. This affords CDOW early comment and participation in the NEPA process.

Page 3, General Comment. CDOW would like to see a wildlife mitigation proposal included in the proposed action in the EA. CDOW would be available to consult on this wildlife mitigation proposal at your earliest convenience. CDOW would also advise scoping a phased drilling approach whereby smaller areas within the project area would be completely drilled out and developed before shifting the disturbance to other areas.

GJFO Response: An exploratory project commonly proposes scattered wells at larger scale geographic intervals, in an attempt to define the qualities and boundaries of a subsurface resource. This approach supports later phases of in-fill drilling where

exploratory results suggest feasible production. It is the intent of the MDP process to identify and plan for impacts of exploration proposals, with larger geographic-scales and smaller well densities, as well as potential future development, with increased well densities in the areas defined by the proposal and analyzed by the EA.

GSEO Response: Wildlife mitigation measures, including standard and site-specific COAs, are presented in the EA. As noted in a previous comment response, the type and amount of mitigation for a project typically evolves from the impact analysis portion of the EA process. Regarding phased drilling, BLM does not dictate the rate or sequence of development unless specified in the lease, and phased drilling is not practicable for an exploratory project such as Orchard II. However, BLM creates some incentives for clustering through the mitigation threshold and for phasing through a requirement that temporary reclamation be conducted for pads left idle for more than one year.

CDOW would like 387 acres of habitat improvement to offset the 129 proposed acres of disturbance (approximately a 3:1 ratio of improvement of disturbance). Reference to Page 5, Paragraph 1.

GSEO Response: BLM has not yet determined the amount of mitigation that would be derived from the calculation method specified in the 1999 FSEIS. We are obligated to use a consistent impact calculation methodology among operators and projects.

GJFO Response: See **Operator Committed Mitigation**.

A closed-loop drilling system affords more wildlife protections than utilization of open pits. Reference to Page 5, Paragraph 2

GSEO response: BLM agrees, but we cannot specify how cuttings are handled.

GJFO Response: See **Operator Committed Mitigation** which includes closed-loop drilling and no reserve pits.

Fencing should be constructed to exclude wildlife as well as livestock. Fencing should also be maintained to ensure entanglement does not occur. Reference to Page 5, Paragraph 5.

GSFO Response: The GSFO does not believe that it is practicable to construct wildlife-proof fencing around pits. However, we do require that pits be constructed and maintained in a way that allows any inadvertently entrapped animals to escape. Additional measures are required to reduce impacts to migratory birds for any pits that contain fluids.

GJFO Response: See Appendix D standard COA number 15 which requires eight-foot woven wire fencing to exclude wildlife from open pits.

Access road cuts and fills should also be reseeded after disturbance occurs. Reference to Page 6, Paragraph 4.

Response: Seeding of road cuts and fills was omitted from Page 6, Paragraph 4. Seeding of road cuts and fills has been included in the revised Proposed Action for the OMDP. Seeding of road cuts and fills is also a COA for reclamation for both GJFO and GSEO.

Minimization of truck traffic, (i.e., centralized fluid collection and water distribution via pipeline) is recommended to reduce impacts to wildlife. Reference to Page 6, Paragraph 6.

> **GSEO Response:** BLM agrees that use of pipelines to reduce truck traffic is beneficial. However, BLM does not specify the method for collecting and conveying fluids. In general, most operators in the GSFO area are beginning to make greater use of pipelines because of their cost effectiveness, as well as their environmental benefits. The extent to which BLM can encourage the use of pipelines is limited by a variety of factors, particularly when a project is exploratory and when the final configuration of producing pads is still unknown. Regarding a centralized facility, BLM believes that this approach is also generally beneficial but, again, cannot require it. Furthermore, for the Orchard II project, since no centralized facility was specified in the Proposed Action, adding one at this date could require additional site surveys to ensure that sensitive resources would not be affected adversely—potentially delaying the process unnecessarily.
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> **GJFO Response**: See **Operator Committed Mitigation** and GJFO COA number 27 requiring the use of produced water pipelines where feasible.

CDOW believes the 114 acres of road and pipeline disturbance should also be mitigated for at a 3:1 ratio of improvement to disturbance for a total of 342 acres of habitat improvement. Habitat improvement/mitigation could also include conservation easements. Habitat enhancement should be scoped and included in the EA. Reference to Page 6, Paragraph 7.

> **Response:** See **Operator Committed Mitigation**.

CDOW encourages reclamation with wildlife-friendly seed mixes. Reference to Page 7, Paragraph 4.

> **GSEO Response**: The GSEO developed a menu-based approach for creating seed mixes that is specific to the four major habitat types in the area: salt-desert scrub, pinyon-juniper woodland/sagebrush shrubland, mixed mountain shrubland (including oakbrush), and spruce-fir forest (including mountain meadows). This approach will allow each operator to design a custom mix selected from a list of acceptable native perennial grasses, including both bunchgrasses and rhizomatous (sod-forming) species and, for lower and middle-elevation habitats, both cool-season and warm-season species. While allowing more flexibility in terms of species composition of the seed mixes, we continue to specify seedbed preparation, seeding method, monitoring/reporting, and certain other aspects of reclamation, as described in the Standard Condition of Approval (COA) for Reclamation attached to the OMDP EA.
>
> We believe that mixes allowable, using GSEO's menu-based approach, are "wildlife-friendly" in that they consist of native grasses selected on the basis of their ability to establish and provide self-sustaining forage, cover, and soil stabilization. We infer that CDOW's comment conveys its desire for the use of species selected on the basis of nutritional value and palatability to wildlife, such as alfalfa and other non-native forbs. It is BLM policy to use genetically appropriate native plant materials based on the site characteristics and ecological setting. We allow the use of non-native species only for temporary disturbances that are not subject to interim reclamation (e.g., topsoil stockpiles and stormwater management features) but warrant temporary reclamation to reduce soil erosion, weed infestations, and visual impacts purposes. Non-natives must be sterile so they will not persist and displace native species.

Shrubs and forbs are no longer included in seed mixes for the GSEO (except for the salt-desert scrub habitat type) for the following reasons: 1) Shrubs and forbs have proven difficult to establish, essentially reducing the quantity of effective species in the mix. The resultant sparse cover is vulnerable to weed invasion. 2) Controlling weeds has proven to be a major challenge to revegetation success, often requiring the use of a selective (broadleaf) herbicide to kill or suppress invasive non-native forbs. Use of a broadleaf herbicide on a revegetated area results in mortality of any forbs or shrubs included in the seed mix. 3) Additionally, shrubs such as the rabbitbrushes (*Chrysothamnus* spp.), sagebrushes (*Artemisia* [*Seriphidium*] spp.), and saltbushes (*Atriplex* spp.) readily colonize from nearby undisturbed areas.

GJFO Response: The seed mixes proposed are based on the soils/plant associations of the area (Appendix D, GJFO No. 18). In the GJFO the wells are proposed in pinyon/juniper and sagebrush sites. The seed mixes contain adapted grass, forb, and shrub species. Adapted meaning capable of establishing within disturbed (rotated) soils and soil conditions which are more prone to invasion by noxious weed species. The first priority on reclamation is the stabilization of soils on site, in conjunction with providing competition against noxious weed invasion. There are many species of grasses, forbs, and shrubs that can meet the need for soil stability and weed competition and are adapted to the site. The use of natives is preferred, although the use of non-native species as a cover crop, or place holder, until natives gain a foothold should be considered, particularly on severe sites under 15 inches of annual precipitation. To prevent loss of broadleaf species as a result of noxious weed treatments, the applicator is required to have an approved Pesticide Use Proposal. Noxious weed inventory needs to be regularly scheduled through the growing season allowing early detection and spot control of the weed species. Spot control would prevent loss of broadleaf species. Use of adapted species and proper noxious weed control would prevent invasion of plant species detrimental to wildlife species.

The roller chops are not an accurate predictor of the success of reclamation on the well pads, access roads, and pipelines as the roller chops maintained soil integrity, decreased competition and had increased litter/mulch. Nevertheless, the seed mixes presented in Appendix D have been successfully used in the project area.

CDOW encourages use of closed-loop drilling systems. However, cuttings which contain hydrocarbons or contaminants from drilling fluids should not be spread on location unless they are proven to be contaminant-free. If the cuttings are spread on location, stormwater controls should be implemented to ensure cuttings are retained on location. Cuttings should not contaminate topsoil. Reference to Page 12, Paragraph 2

Response: Cuttings, when developed during conventional drilling with reserve pit, are buried on location within the confines of the pit. With closed-loop drilling, cuttings are typically stored on location, generally against the cutslope, and stormwater controls are used to ensure that the cuttings and other materials transportable through hydrologic means remain onsite. BLM does not allow cuttings to be spread on public lands. Cuttings will be buried as would reserve pit contents (Appendix D, GJFO No. 15 and GSEO No. 19).

CDOW encourages consolidating activity on each well pad before moving to the next well pad. Anything that can be done to minimize truck traffic and consolidate activity is better for wildlife than having activity scattered throughout the project area. Reference to Page 12, Paragraph 5

Response: BLM agrees, but see our previous comment responses involving phased development and use of pipelines to reduce truck traffic. The operator has proposed to use remote telemetry and the piping of produced water where possible (**Operator Committed Mitigation** and Appendix D, GJFO No. 21). Remote monitoring typically reduces truck traffic and scales back several impacts, notably those to wildlife and air quality. By implementing the proposed action analyzed in the 2005 Orchard Unit GAP EA and gaining information on resource development, the operator has presented the OMDP, which portrays an additional 2-3 year drilling plan comprised primarily of in-fill field development, with some exploratory wells planned at the western and southern edges of the OMDP boundary.

Sharing equipment on multi- well pads to the extent feasible is encouraged. Reference to Page 13, Paragraph 1.

Response: Co-location of facilities (typically separators and/or storage tanks) serving wells on two or more pads is encouraged by the BLM but cannot be required. BLM also strongly encourages that production facilities are located and arranged to facilitate safety and minimize surface disturbance. By implementing the proposed action analyzed in the 2005 Orchard Unit GAP EA and gaining information on resource development, the operator has presented the OMDP, which portrays an additional 2-3 year drilling plan comprised primarily of in-fill field development, with some exploratory wells planned at the western and southern edges of the OMDP boundary.

Use of radio telemetry to remotely monitor wells pads as soon as is feasible is encouraged. Reference to Page 13, Paragraph 2.

Response: See previous comments.

Limiting habitat fragmentation and disturbance effects by transporting fluids via pipeline is preferred over transporting water via truck. Reference to Page 13, Paragraph 5.

Response: See previous comments.

CDOW advises cool season reclamation. Reclamation and weed control standards should be determined prior to project implementation, and monitored until reclamation objectives are achieved. Reference to Page 14, Paragraph 3

Response: The GSEO no longer dictates what time of year an operator should conduct reclamation based on two considerations: 1) Allowing seeding closer in time to the completion of ground-disturbing activities reduces the potential for establishment of weeds and prevents crusting of the soil, which can impede germination. 2) Local patterns of precipitation and soil moisture are highly variable, both temporally and spatially, with suitable conditions not necessarily tied to the late winter/spring or late summer/fall periods.

Regardless of when an operator chooses to implement seeding, the standards for reclamation success will still apply, and the operator will be accountable for the end result rather than the process (i.e., the reclamation standards are performance based). If revegetation is unsuccessful due to inadequate germination or establishment of seeded plants, the operator shall make subsequent reseedings until the reclamation objectives identified in Appendix I (Surface Reclamation) of the 1998 DSEIS are met.

Additionally, operators are required to regularly monitor and promptly control noxious weeds or other undesirable plant species as set forth in the *Noxious and Invasive Weed Management Plan for Oil and Gas Operators*, subscribed to by the Glenwood Springs Energy Office, Grand Junction Field Office and Grand Valley Ranger District dated March 2007.

Seed mixes should be proposed by BLM in consultation with CDOW. Reclamation should have clearly defined and measurable standards. Reference to Page 15, Paragraph 3.

Response: The GSEO Ecologist sent proposed OMDP seed mixes to CDOW for their review on February 27, 2008. Reclamation objectives identified in Appendix I (Surface Reclamation) of the 1998 DSEIS will be followed on GSFO land within the OMDP. Coordination on seed mix is appropriate. The goals of reclamation and site capability should be understood and agreed to by the parties involved.

CDOW requests shape files of the proposed development (i.e., well pads, access roads, pipeline rights of ways) be submitted so we can evaluate placement of facilities in proximity to sensitive wildlife habitats. Please submit these shape files to CDOW as soon as possible. Reference to Pages 16-19.

Response: Shapefiles of proposed developments within the OMDP were sent to CDOW on March 7, 2008.

CDOW advises the operator to initiate a food and waste management and education program to reduce human/bear conflicts. Also we advise use of bear-proof trash receptacles. CDOW prohibits feeding of black bear and encourage immediate reporting of bear conflicts with humans. Reference to Page 24, Paragraph 7.D.

GSEO Response: BLM requires that operators maintain a "clean" pad. We have not historically required the use of bear-proof containers, except for "employee camps," because of the transitory nature of human occupation of a drill pad. Since some multi-well pads are now occupied by humans "24/7" over a period of many months, we will consider such a requirement in the future, perhaps tied to the anticipated duration of occupancy of the pads.

GJFO Response: See Appendix F, GJFO site-specific COAs.

CDOW also advises designing culverts to manage 100 year storm events. Reference to Page 45, Paragraph 5

Response: BLM's "Gold Book" standards specify a 25-year storm event for culverts related to oil and gas development. Although we realize that larger runoff events may occur during the life of a pad, the situation in the Orchard II project area is such that loss of a culvert would be a relatively low-consequence occurrence. Nonetheless, our COAs include a statement that drainages deemed to be "waters of the U.S." under Section 404 of the Clean Water Act fall within the jurisdiction of the U.S. Army Corps of Engineers (USACE), which may require that culverts safely convey a 100-year runoff event as a condition for approval. Most drainages with the potential to exceed the capacity of a 25-year culvert are waters of the U.S. and hence regulated by the USACE.

CDOW also recommends live topsoiling practices be implemented by the operator. Reference to Page 48, Paragraph 14.

Response: The GJFO and GSEO currently require seeding of all topsoil stockpiles to maintain soil microbe health and prevent weeds. Native or non-native, non-persistent sterile grasses may be used to seed stockpiles. We agree with CDOW that live topsoiling—i.e., hauling soil directly from a newly disturbed area to an area of active or pending reclamation to reduce the duration of stockpiling—is beneficial. However, we do not see that it would be practicable for oil and gas pads, since the pads necessarily remain in a partially disturbed condition for many years, unless the wells are unsuccessful and the pad abandoned. Also, the topsoil removed during construction of a new pad would exceed the amount needed for interim reclamation of an existing pad and so could never be as effective as in surface mining, where it used most successfully. However, we will consider a COA for live-topsoiling when practicable. The redistribution of salvaged topsoil over the areas unnecessary to production at the time of interim reclamation helps to keep topsoil viable through the life of the pad. It is spread more thinly than a storage pile allows, so that soil conditions remain as ecologically sustainable as possible, and when it is successfully seeded with a self-sustaining plant community, soils remain stable and biologically active.

CDOW advises that all erosion control materials be certified weed free prior to installation. Reference to Page 49, Paragraph e.

Response: The reclamation COA specified contains such a requirement that erosion control materials be certified weed-free.

CDOW would like to consult with BLM on the site protection and fencing standards to ensure wildlife is protected. Reference to Page 49, Paragraph f.

Response: BLM already specifies that fencing to exclude livestock conforms to CDOW standards for strand height and material. As noted in a previous comment response, GSFO does not require fencing to exclude wildlife. See Appendix D, GJFO Nos. 15 and 18 regarding fencing.

CDOW also advises that reclamation monitoring program also include noxious weed surveys and treatments. Reference to Page 49, Paragraph g.

Response: Operators are required to regularly monitor and promptly control noxious weeds or other undesirable plant species as set forth in the Glenwood Springs Energy Office, Grand Junction Field Office and Grand Valley Ranger District *Noxious and Invasive Weed Management Plan for Oil and Gas operators*, dated March 2007. Additionally, environmental surface inspections of pads, pipelines, and roadsides conducted by multiple BLM personnel throughout the summer include surveys for noxious and invasive weeds. See Appendix D, GJFO No. 19 and GSEO No. 7.

CDOW would like to see proof through monitoring that terrestrial wildlife stipulations are being enforced. Reference to Page 50, Paragraph 19. – this refers to remote telemetry…

Response: BLM's records of inspections are available for review at the Energy Office. Furthermore, the presence of radiotelemetry equipment on pads suggests that such practices are being implemented. See **Operator Committed Mitigation**.

CDOW advises that spills which could adversely affect aquatic or terrestrial wildlife be reported to CDOW in addition to the other appropriate reporting agencies. Reference to Page 51, Paragraph 22.

Response: Should a spill occur that adversely affects aquatic or terrestrial wildlife, the state of Colorado will be notified.

CDOW advises no surface occupancy and a riparian buffer zone of 300 feet from center line of the drainage be retained to protect aquatic resources. Reference to Page 53, Paragraphs 1-3.

Response: The proposed action would not result in impacts to riparian and wetland habitats or be located within 500 feet of the outer edge of such habitats.

It has come to our attention that there is a proposed pipeline that will be coming through this area. While the pipeline may be considered under a different NEPA process, it should be discussed and considered under this document. Disclosure of related impacts is necessary to determine impacts on a larger scale. This will be addressed in the section on cumulative effects.

Response: The potential impacts of this proposed project (EnCana's Collbran Pipeline) are disclosed in the Cumulative Impacts section.

Colorado Mule Deer Association

In their letter to the BLM, the Colorado Mule Deer Association provided these comments:

Commenter states that comments are based on the following assumptions.

1. The EA for the OMDP II will be tiered off the EA for OMDP I.
2. EnCana will continue to submit work planned for 2-3 years at a time until full development is reached.
3. The EA for Phase II will only contain discussion for new impacts not covered in Phase I.

Response: In regards to the assumptions, OMDP is an Environmental Assessment of the operator's 2-3 year drilling plan (2009-2011) for the Orchard Federal Unit and surrounding areas in Grand Junction Resource Area. The 1999 O&G SEIS (GSFO) provides clear direction for the preparation of such GAPs (now referred to as Master Development Plans per Onshore Order #1). The OMDP includes a Cumulative Impacts section to address the overall impacts of the Orchard Unit GAP, OMDP and other proposed projects (EnCana's Collbran Pipeline).

The EA does not present specifications to which roads will be built. Some general comments about crowning and drainage are given but no specific references. For example, will all roads be gravel surfaced, or some of them? What will compaction requirements be for subgrades, what will be thickness of gravel mat, will any roads be chemically treated to control dust if not graveled, and will all roads be open to public vehicular use on public land? Phase 1 EA says some roads will be gated, when in reality only the road to A280U will be? If no good defensible spot exists to gate this road, how will vehicular use be controlled and who will be responsible for it? Will all other roads be open to full public use?

Response: All roads will be constructed in accordance with 'The Gold Book'; additional requirements pertaining to roads are included in **Transportation**.

There is no discussion of what the impacts and affects of the heavy truck traffic is on Garfield County roads being used for access and who is responsible for repairing the damage.

Response: Disclosure is made in the EA (Proposed Action & Access and Transportation section) of the various Garfield and Mesa County Roads that will be used by the operator. County roads are under jurisdiction of the appropriate counties, and the Road and Bridge Departments dictate load requirements, use permits, access permits, and general maintenance agreements with the operators for such use. See Appendix D, GJFO number 4.

Phase 1 EA (-Orchard Unit GAP-) states that Special Status plants will be impacted by increased OHV use of the area due to the new road system implemented. Yet BLM presents no mitigation for this. Due to the open nature of the area, off road travel will likely increase dramatically. How does the BLM plan to control and police this use?

Response: Orchard Unit Gap does state in its assessment of impacts for Sensitive Plant Species: "Damage to its habitat may occur if OHVs diverge from the roads and travel cross-country through open hillsides and benches. Since this area is currently designated "open" for cross-country travel in the 1984 GSRA RMP (BLM 1984), the Proposed Action may result in negative impacts to (sensitive plant) habitat." There have been no dramatic increases in OHV use noted since the onset of oil and gas development, to date. Mitigation implemented in Orchard Unit GAP and proposed for OMDP would be gating of access roads to pads – particularly roads and pads on private land (as required by the surface landowner). In some instances, gates could be installed on road spurs serving pads on BLM land The majority of the roads serving the OMDP are public (including County roads), and BLM does not believe that closing such roads to curtail a perceived OHV problem would be prudent. The RMP revision currently in progress would prescribe a designated road system for the Resource Area, including the OMDP area.

It is unknown whether OHV use will increase due to the building of new access roads in the OMDP area. However, mitigations have been included in the EA to provide protection for special status plants in case direct or indirect impacts occur from OHV use. Monitoring of OHV use would be required for all special status plant populations within 600 feet of ground-disturbing activities (See Appendix F of OMDP EA). If OHVs are determined to be affecting special status plants, appropriate measures would be taken, such as installing signage, fencing affected plant populations, or gating and locking certain access roads to prohibit OHV use.

GJFO Response: The Grand Junction Resource Management Plan (1987) designates the areas bounded by the OMDP as "Open – general areas where no significant off-road issues occur." and as "Seasonal – limitations to protect big game species during harsh winters only." The land designated open to unrestricted vehicle use, including cross-country travel, was left open because vehicle use did not conflict significantly with other uses on this land.

The BLM [GSEO] has taken the stance that drilling four wells per section can be changed to four drill pads per section and they are equivalent actions. This was done with no public comment allowed. The COGCC has stated that down hole well spacing in this area will very likely be 10 acres meaning that a total of 64 wells will be drilled per section. The present surface spacing of well pads is 160 acres. This will be 16 wells per pad. The present size pads are being constructed for four wells. To accommodate the additional wells, the pads will have to be enlarged. When will this increased surface disturbance be addressed?

Response: The majority of OMDP lies within the Orchard Federal Unit which, by regulation, has no spacing requirements. The operator has submitted a drilling plan which

presently forecasts 4 wells per pad on average. Should additional wells be desired in the future, review of the proposed pads would be conducted, plans developed and impacts analyzed (including any increase in surface disturbance) in future NEPA document(s). Sub-surface spacing no longer equates with surface disturbance of one pad per well, with the advent of directional drilling. The purpose of multi-directional drilling of several wells from one pad is to decrease surface disturbance and spacing while increasing subsurface bottomhole spacing.

This increased well density means that time for drilling will be increased by a factor of four. When will this be addressed or will it? It would appear that once the roads and pads are in place EnCana can return and drill the remaining wells essentially without any further environmental review. Is that correct?

Response: The BLM does not currently have information regarding the operator's plans for the development of these leases beyond 2011. BLM can only evaluate what is being proposed and typically does not analyze a hypothetical full-field development. Those scenarios are covered on land use planning documents. As stated above, should additional wells be desired in the future, review of the proposed pads would be conducted, plans developed and impacts analyzed (including any increase in surface disturbance) in future NEPA document(s). Please see the reasonably foreseeable development scenario presented in the **Cumulative Impacts Analysis** section and the **Future Implementation Actions Using Statutory Categorical Exclusions** section.

Exceeding an average of four well pads per section is the point where mitigation is required. Thus, as long as EnCana does not exceed a total of 75 well pads within this GAP, no habitat mitigation is required even though there are significant impacts to nearly all resources. Is that correct?

GSEO Response: Please review the Wildlife Threshold Analysis presented under Terrestrial Wildlife section of the EA for a complete accounting of the need for wildlife habitat mitigation.

GJFO Response: Please see **Operator Committed Mitigation**.

The 1988 (1999) Supplemental EIS states that, a specific discussion on the potential for reclamation success will be done for each APD. This discussion will include past reclamation work on existing disturbances and soil characteristics. In the Phase 1 EA no such discussion exists. Since the BLM states that the soils are highly alkaline in this area, reclamation is anything but assured. This is borne out by past reclamation efforts. Why was this discussion not done and will it be done in the Phase 2 EA?

Response: We do recognize that reclamation success in Orchard Unit GAP and the OMDP has been and will continue to be a challenge. The challenges are grounded in many factors including the relatively low annual precipitation and the predominant cheatgrass understory in many areas. Alkaline soils can also make reclamation difficult, but according to the Vegetation section of the 2005 Orchard Unit GAP EA, the vegetation types typically associated with alkaline soils (shadscale saltbush and greasewood flats) only make up 1% or 65 acres of the project area. According to the Vegetation section of the OMDP EA, the vegetation types typically associated with alkaline soils (shadscale saltbush and greasewood flats) only make up 4.4% or 530 acres of the OMDP area. Since only 4.4% of

the OMDP contains alkaline soils and the success of the Sand Wash roller chop, there is no reason to expect that reclamation will not be successful.

Soil characteristics, native vegetation types, and reclamation potential are observed, noted and discussed at onsite inspections conducted for each proposed pad, road or pipeline. Components of these discussions are included in the EA, either in the Vegetation section and as Conditions of Approval (see Appendix D and F). Additionally, the BLM requires operators to submit annual reclamation monitoring reports and plans which address past and ongoing reclamation efforts.

The reclamation standards are very generic and subject to personal bias. The Supplemental [GSEO] EIS says that percent cover will be the evaluating characteristic without qualifying what constitutes success. The 3x3' area evaluated must have less than 5% undesirable vegetation, contain at least 10% forbs and 5-10% shrubs, and percent canopy cover is comparable to surrounding similar vegetation. But there are no requirements to actually measure surrounding vegetation and all measurements can be estimates. There for how is reclamation success gauged?

Response: Current reclamation standards in the 1998 Supplemental EIS include the following reclamation objectives: 1) No noxious weeds are present. 2) Undesirable vegetation comprises little (less than 5%) of the species composition on sites with three or more growing seasons. 3) Desirable vegetation appears vigorous and self-sustaining. (The plants have the opportunity to complete their annual life cycles.) 4) Adequate diverse vegetation is present. (Ideally, a good grass cover with an estimated 10% forbs and 5 to 10% shrubs would be present and the canopy cover of the reclaimed site should be equal to or greater than similar sites on the adjacent undisturbed area.) To evaluate achievement of the objectives and determine the stage of reclamation, canopy cover by species will be measured or estimated and a 3 foot x 3 foot grid will be photographed at representative locations on the site and adjacent disturbed areas.

The key problem with visual estimation of cover plots is the introduction of an unknown level of observer bias. Estimating cover using quadrats remains popular, however, because of the ease and speed at which data can be collected. Some techniques have been used to improve the reliability and repeatability of visual estimates. Cover is more similarly evaluated in small quadrats than larger ones. Also, use of frames that contain a known number of grid squares can also increase the similarity of estimates among observers (Elzinga et al. 1998). The purpose of the gridded 3-foot by 3-foot quadrat is to reduce observer bias and error in canopy cover estimations. It is clear in the 1998 SEIS that cover will be measured and photographed at representative locations within the reclaimed site and adjacent to the reclaimed site in the surrounding undisturbed vegetation. Reclamation success is based on whether the previously mentioned objectives are met.

The EA for Phase 1 specifically says that seeding can only be done between 9/1 and first frost. If local weather records are consulted, you will find that the months of August, September and October are the three consecutively wettest months of the years and thus the best for reclamation. Therefore the best time to seed is in July but in reality any time of the year is good. Springs are inherently dry and that agrees with the normal peak fire danger which usually drops in late July with the arrival of the monsoons. The herbaceous vegetation in this area has a high cheatgrass component. Waiting until fall to seed means that the cheatgrass has a 1-2 month jump on the seeded vegetation which can easily cause complete failure of the seeded vegetation due to competition. Why has the BLM put this restriction on when disturbance can be seeded? Further,

the discussion does not include a time frame from cessation of disturbance until seeding is required. Why not?

Response: In a letter to all oil and gas operators dated April 16, 2007, concerning Revisions to BLM Energy Office Revegetation Requirements, the following statement was made: "In an ongoing effort to increase the effectiveness of reclamation for oil and gas activities while also providing increased flexibility for operators, the Glenwood Springs Energy Office (GSEO) has revised some aspects of our revegetation requirements." One of the revisions was "Eliminating the specified spring/fall seeding schedule." This was based on two considerations:

- Allowing seeding closer in time to the completion of ground-disturbing activities reduces the potential for establishment of weeds and prevents crusting of the soil, which can impede germination.

- Local patterns of precipitation and soil moisture are highly variable, both temporally and spatially, with suitable conditions not necessarily tied to the late winter/spring or late summer/fall periods.

Additionally, regardless of when an operator chooses to implement seeding, the standards for reclamation success will still apply, and the operator will be accountable for the end result rather than the process (i.e., the reclamation standards are performance based). If revegetation is unsuccessful due to inadequate germination or establishment of seeded plants, the operator shall make subsequent reseedings until the reclamation objectives identified in Appendix I (Surface Reclamation) of the 1998 DSEIS are met.
Included in the Reclamation COAs attached to the OMDP are deadlines for temporary and interim reclamation. "The operator will be allowed to construct the well pad to the maximum expected pad size necessary to drill and complete the number of wells proposed for this location. After 1 year from spudding the initial well, or 1 year after spudding any successive well(s), the operator shall implement and complete the standard interim reclamation practices identified above OR submit proposed best management practices to be approved by the authorized officer that would be implemented on the "open" pad to control stormwater runoff, weed control, wildlife protection, dust abatement, and/or visual resource management. Areas subject to interim reclamation but scheduled to remain in a disturbed condition for more than 1 year shall undergo temporary reclamation, as described above."

In the preferred seed mix for Phase 1, bottlebrush squirreltail is listed. This species is very seldom found in this area naturally and is a poor competitor here. Past use of this species was a complete failure. Why is it included in the mix? Even though the GAP area contains crucial winter range for deer and elk, only common Wyoming sagebrush is listed instead of better named varieties such as Hobble Creek and Gordon Creek. Why not use the better named varieties?

GSEO Response: We have found bottlebrush squirreltail (*Elymus elymoides*) to be common and widespread in salt-desert shrublands and pinyon-juniper woodlands within the GSFO. This species is also highly recommended for use in revegetation by many seed and reclamation experts in Colorado and elsewhere. It has been known to be a good competitor with cheatgrass.

Seed mixes have changed since the previous Orchard GAP. Previously, the use of BLM-specified seed mixes, in terms of both species composition and relative amounts, was

required to ensure that operators planted the appropriate native species in the appropriate quantities. While this continues to be an important goal, some operators have requested the ability to develop the mixes themselves, allowing more flexibility with availability, price, and preferences of their reclamation personnel or contractors.

To allow this type of flexibility while ensuring appropriate species are used, we have developed a menu-based approach specific to the four major habitat types in the area: salt-desert scrub, pinyon-juniper woodland/sagebrush shrubland, mixed mountain shrubland (including oakbrush), and spruce-fir forest (including mountain meadows). This approach will allow each operator to design a custom mix selected from a list of acceptable native perennial grasses, including both bunchgrasses and rhizomatous (sod-forming) species and, for lower and middle-elevation habitats, both cool-season and warm-season species. While allowing more flexibility in terms of species composition of the seed mixes, we continue to specify seedbed preparation, seeding method, monitoring/reporting, and certain other aspects of reclamation, as described in the Standard Condition of Approval (COA) for Reclamation attached to the OMDP EA.

The seed menus for the following habitat types: salt-desert scrub, pinyon-juniper woodland/sagebrush shrubland, and mixed mountain shrubland (including oakbrush) include the option to use bottlebrush squirreltail in the seed mix designed to reclaim those habitat types. It is the operator's choice, not a requirement, if they want to use bottlebrush squirreltail in their reclamation seed mixes.

Sagebrush is no longer included in seed mixes for the GSEO for the following reasons: 1) Shrubs have proven difficult to establish, essentially reducing the quantity of effective species in the mix. The resultant sparse cover is vulnerable to weed invasion. 2) Controlling weeds has proven to be a major challenge to revegetation success, often requiring the use of a selective (broadleaf) herbicide to kill or suppress invasive non-native forbs. Use of a broadleaf herbicide on a revegetated area results in mortality of any forbs or shrubs included in the seed mix. 3) Additionally, shrubs such as the rabbitbrushes (*Chrysothamnus* spp.), sagebrushes (*Artemisia* [*Seriphidium*] spp.), and saltbushes (*Atriplex* spp.) readily colonize from nearby undisturbed areas.

GJFO Response: The seed mixes proposed are based on the soils/plant associations of the area (Appendix D, GJFO No. 18). In the GJFO the wells are proposed in pinyon/juniper and sagebrush sites. The seed mixes contain adapted grass, forb and shrub species. Adapted meaning capable of establishing within disturbed (rotated) soils and soil conditions which are more prone to invasion by noxious weed species. The first priority on reclamation is the stabilization of soils on site, in conjunction with providing competition against noxious weed invasion. There are many species of grasses, forbs and shrubs that can meet the need for soil stability and weed competition and are adapted to the site. The use of natives is preferred, although the use of non-native species as a cover crop, or place holder, until natives gain a foothold should be considered, particularly on severe sites under 15 inches of annual precipitation. To prevent loss of broadleaf species as a result of noxious weed treatments, the applicator is required to have an approved Pesticide Use Proposal. Noxious weed inventory needs to be regularly scheduled through the growing season allowing early detection and spot control of the weed species. Spot control would prevent loss of broadleaf species. Use of adapted species and proper noxious weed control would prevent invasion of plant species detrimental to wildlife species.

The roller chops are not an accurate predictor of the success of reclamation on the well pads, access roads and pipelines as the roller chops maintained soil integrity, decreased competition and had increased litter/mulch. Nevertheless, the seed mixes presented in Appendix D have been successfully used in the project area.

The text of Phase 1 EA [2005 GSEO] says that often reclamation is better than original vegetation with no references given. However, in this area that is not necessarily true and gives a false assumption of success.

GSEO Response: In some situations, e.g., when cheatgrass or other non-native species are the dominant vegetative component of an area, it may be possible to reclaim or restore that area with more diverse native species than what was there prior to disturbance. However, it is also possible in areas with low rainfall and poor soil, to make an area much worse than it was prior to disturbance by increasing the percent of noxious and invasive weeds. For the OMDP, the proposed action has the potential to expand noxious weed cover, such as cheatgrass. However, given the reclamation challenges for much of the OMDP project area, if the implementation of mitigation measures (Appendix D, GJFO Nos. 18 & 19 and GSEO Nos. 7 & 13) is successful, the proposed action is not likely to contribute to further degradation of vegetation. This is dependent on the fact that reclamation measures are effective. If they are not effective, the BLM may require the operator to retreat the area until success is achieved.

Under the discussion of wildlife habitat in Phase 1 EA, the following statements are made with no referencing provided. "Although the Proposed Action would add to the disturbance of sagebrush habitats and pinyon-juniper woodlands, the BLM stipulations and mitigation measures proposed in this EA would minimize the impact from the proposed project. Thus, the Proposed Action may in time, result in an upward trend of wildlife habitat within the OUGA." Those statements are some ones best pipe dreams. Unless the BLM can present data which backs up those statements, they have no place here.

Response: Refer to the discussion of impacts and trends in the Terrestrial Wildlife section of OMDP.

The text of Phase 1 EA says that all reclamation on well pads will be fenced to exclude livestock grazing to protect and promote establishment. No mention is made of fencing out pipeline ROWs and also road ROWs. How will the reclamation of these disturbances be protected?

Response: It is not the policy of the BLM to require fencing of reclaimed pipelines and road ROWs as a general measure. If reclamation of pipelines and roadsides is unsuccessful, BLM would take one of two approaches: (1) If the seeding is unsuccessful due to inadequate germination or competition by weeds, the operator would be required to make subsequent reseedings and/or implement weed control until the reclamation objectives identified in Appendix I (Surface Reclamation) of the 1998 DSEIS [GSEO] are met. (2) If the seeding is unsuccessful because of livestock grazing, as a result of either trampling or predation on the young plants, BLM would require that the operator erect a fence to exclude livestock. In rare circumstances, failure of pipeline revegetation efforts may cause BLM to reevaluate the grazing regime, but this would be unrelated to the operator's responsibilities. The BLM will use adaptive management techniques, including cooperative problem solving among stakeholders (i.e. BLM, EnCana and ranchers), to ensure successful mitigation.

The text of Phase 1 EA [GSEO] states that all reclaimed well pads will be fenced to exclude livestock and big game. However under Reclamation mitigation only fencing of livestock will be done. Which will be done?

> **Response**: The Orchard Unit GAP (p. 12, p.14) does talk about fencing to exclude wildlife. The first reference on p. 12 states that the production equipment would be fenced to prevent contact with wildlife/livestock at the surface owner's request. The second reference on p. 14 states that the "Pads would be fenced for the first two growing seasons or until the seeded species have established to prevent livestock/wildlife grazing pressure." We agree that the previous Orchard Unit GAP was confusing on the purposes for fencing. The OMDP will contain the following COA under Reclamation: "The pad shall be fenced to BLM standards to exclude livestock grazing for the first two growing seasons or until seeded species are firmly established, whichever comes later. The seeded species will be considered firmly established when at least 50 percent of the new plants are producing seed. The authorized officer will approve the type of fencing." See previous comment response regarding wildlife fencing, which the GSEO does not require.

All EAs written on gas development that discuss water use state that water depletion is not an issue for that project. But nowhere is long-term depletion discussed. The 1998 Supplemental EIS does not address the subject of water depletion. Therefore, how can the BLM state there is no cumulative depletion of water to the Colorado River with no data or reference to back up that statement? The EA Phase 1 does state that a onetime payment was made to the USF&WS for water depletion. What was this based on as the intensity of development and water use has increased dramatically in the last few years?

> **Response**: The OMDP will address this topic. Depletions as a result of oil and gas development are likely, and the U.S. Fish and Wildlife Service (USFWS) considers any depletion a sufficient basis for a determination of "May Affect, Likely to Adversely Affect." However, such depletions are covered under an existing agreement between USFWS and BLM, which specifies annual mitigation payments. This agreement, embodied in a biological opinion (BO), is currently being updated to reflect the increasing oil and gas development in the GSFO area.

Town of De Beque

In their letter to the BLM, the Town of DeBeque provided the following comments:

Page 2 of the plan includes the statement that 35 wells are expected to be drilled in 2007. It would seem reasonable to conclude that any environmental repercussions would therefore begin before the comment period began on the plan.

> **Response**: Error has been corrected on page 2 to show the 35 wells planned for 2009.

The plan could fairly be described as a compilation of inconsistencies. Pages 4 and 5 disagree on long-term disturbance acreage. Computations used in either disturbance acreage estimate are curious. Statements about road building and disturbance acreage are illogical, at best.

> **Response**: The 69.6 acres shown in Table 1 as total long-term disturbance acres is accurate. The narrative on pages 5 and 6 explain the components of long-term disturbance

(37.5 acres for proposed pads and 32.1 acres for proposed roads) which comprise the 69.6 acre total. A footnote has been added to Table 1 to note this calculation and avoid confusion.

Page 7 includes a glib statement about existing offsite evaporation pond facility but fails to address where that facility is and whether it is overloaded.

Response: The reference made to "existing offsite evaporation pond facility" was in the context of disposing water used for pressure-testing new pipelines. This statement will be revised to state: "After testing, water used in pressure testing of lines will be disposed at a State-approved facility or reused for drilling and/or completion operations."

Perhaps most offensive of all is the statement that the no action alternative would have the same impact has (as) full development. One would think that if NEPA compliance was a problem, BLM might comply with the Federal law through limiting roads and pipelines on Federal property.

Response: Clarification has been added to the statement you reference as follows (with clarifying language shown in italics): Under the no action alternative, production and maintenance of the *72* existing wells will continue into the foreseeable future and the *approved A28OU pad and six wells could be developed.*

BLM's plans should be evaluated as would any other developer's plans. In addition to complying with NEPA, BLM should deal with is offsite impacts. In particular, the truck traffic and its adverse impacts at the I-70 interchange at DeBeque should be mitigated. The disposal of excess water from drilling operations must be addressed rather than simply saying it will be removed.

Response: The BLM has analyzed cumulative impacts of the Proposed Action in OMDP EA. Impacts of heavy truck traffic on roads are addressed in the EA, Access and Transportation section. BLM has no authority to require the operator to address impacts at the I-70 interchange. BLM has requirements under Onshore Order #7 that specifically regulate the disposal of produced water from Federal wells. See **Operator Committed Mitigation** regarding water lines and telemetry, which will further limit truck traffic and related impacts.

Garfield County Road and Bridge Department

In their letter to the BLM (dated January 2, 2008), the Garfield County Road and Bridge Department (GarCo) provided the following comments:
Garfield County Road & Bridge Department has no objections to the future development of the Orchard Unit and EnCana's plans. We would request that the lower portion of Cr. 306 (Wallace Creek Road) be repaired and a 4-inch asphalt mat be put in place from the intersection of Cr. 300 (Parachute Una Road) up Cr. 306 to meet the upgraded portion of Cr. 306.

Response: As BLM has no authority to dictate operator improvements to County Roads, this comment has been passed along to EnCana so they may coordinate with GarCo on these requests.

Any new access roads from Cr. 306 would require a driveway access permit issued by Garfield County Road & Bridge Department with conditions specific to the driveway access location.

Response: The operator is aware that they must obtain authorization from GarCo for any new access roads from CR 306.

Wilderness Workshop

In their letter to the BLM the Wilderness Workshop provided the following comments:

NEPA requires agencies to take a "hard look" at impacts of connected, cumulative and similar actions, including impacts of past actions and reasonably foreseeable actions.
The National Environmental Policy Act (NEPA), 42 USCS §§ 4321, et. seq., requires that Federal agencies take a "hard look" at the direct and indirect environmental impacts of oil and gas development before any action that will lead to such development takes place. See, e.g., Pennaco Energy, Inc. v. U.S. Department of the Interior, 377 F.3d 1147 (10th Cir. 2004); Conner v. Burford, 848 F.2d 1441 (9th Cir. 1988); Sierra Club v. Peterson, 717 F.2d 1409 (D.C. Cir. 1983). NEPA's regulations further provide that the "effects" on the environment that agencies must consider include those that are "direct, indirect, or cumulative." 40 C.F.R. § 1508.8.

NEPA clearly requires agencies to consider connected actions along with cumulative impacts of proposed actions. This interpretation is accepted by courts and implemented through Council for Environmental Quality (CEQ) regulations. 40 CFR 1508.25(a)(1)). NEPA regulations define "cumulative impact" as:

> the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

40 C.F.R. § 1508.7. The Supreme Court held that, under NEPA,

> proposals for . . . related actions that will have cumulative or synergistic environmental impacts upon a region concurrently pending before an agency must be considered together. Only through comprehensive consideration of pending proposals can the agency evaluate the different courses of action.

Kleppe v. Sierra Club, 427 U.S. 390, 410, 49 L. Ed. 2d 576, 96 S. Ct. 2718 (1976). CEQ regulations specifically provide that a NEPA analysis should consider actions that "are interdependent parts of a larger action and depend on the larger action for their justification," as well as "cumulative actions, which when viewed with other proposed actions have cumulatively significant impacts," and "similar actions, which when viewed with other reasonably foreseeable or proposed agency actions, have similarities that provide a basis for evaluating their environmental consequences together, such as common timing and geography." 40 C.F.R. § 1508.25(a) (1987); see also Council on Environmental Quality, Forty Most Asked Questions Concerning CEQ's NEPA Regulations, 46 Fed. Reg. 18,033 (1981).

Because the OMDP will constitute part of the growing web of natural gas infrastructure woven across Colorado's western slope, the cumulative impact analysis undertaken by the BLM in this case must be wide ranging. The analysis must take into account impacts of all reasonably foreseeable future development as well as all related existing developments. The scope of this

analysis must take into account related development within the GSFO, the GJFO, lands administered by the GSEO, as well as existing and reasonably foreseeable development on other public and private lands in the area. Analysis of related development will include all infrastructure related to the production and transport of natural gas (e.g., pipelines, wells, compressors, reserve pits, roads, etc.).

Any impact analysis must take into account direct, indirect, and cumulative effects on key environmental, social, and economic resources. Important environmental resources include: wildlife, water quantity and quality, air quality, soils, vegetation, and impacts to specially designated and protected lands. Important social and economic resources include: recreation, public and private land access, economic impacts on surrounding communities and surrounding property owners, traffic, and costs associated with increasing infrastructural needs. An adequate analysis will also address indirect impacts, like those associated with inadequate housing inventories and a swelling labor force—drawn to the region by booming natural gas development. Also important for any NEPA analysis are the environmental and social effects of support industries necessary to sustain this boom (e.g., proliferating gravel pits along the Colorado River corridor needed to support oil and gas related road building).

> **Response:** The cumulative impacts section of the environmental assessment includes an analysis of past, present and reasonably foreseeable future actions, including oil and gas development, residential and commercial development, agriculture, and road construction that have impacted the cumulative impact assessment area to varying degrees. This analysis constitutes the "hard look" required under NEPA.
> The BLM is not aware of any other actions that would meet the criteria for a connected action as described in the CEQ regulations. That is, no other actions are known that would be automatically trigger the Orchard MDP, that could not proceed without the Orchard MDP , or that would depend on the Orchard MDP for its justification. (see 40 CFR § 1508.25).

The BLM cannot avoid conducting thorough cumulative impact analyses by tiering to outdated or inadequate planning documents.

Regulations suggest that tiering is inappropriate where broad environmental impact statements are outdated and in need of supplementation. CEQ regulations say:

> (c) Agencies:
> (1) Shall prepare supplements to either draft or final environmental impact statements if:
> (i) The agency makes substantial changes in the proposed action that are relevant to environmental concerns; or
> (ii) There are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts.

40 CFR § 1502.9. The Council on Environmental Quality requires supplementation where "[t]here are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts." 40 CFR § 1502.9(c)(1)(ii) (2003).

The BLM cannot continue to tier site-specific oil and gas environmental impact analyses to outdated or obviously inadequate planning documents. Specifically, the BLM cannot simply incorporate the 1999 Glenwood Springs Oil and Gas Leasing and Development Supplemental EIS (SEIS). The 1999 SEIS is out of date and no longer reflects a realistic picture of oil and gas

development on lands within the GSFO or lands administered by the GSEO.[1] The same is likely true of GJFO oil and gas planning documents.

The unexpected boom of oil and gas development within the GSFO rises to the level of "significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts" and mandates preparation of a new supplement or a new Environmental Impact Statement. 40 CFR § 1502.9. Because the 1999 SEIS no longer reflects a reasonably foreseeable development scenario within the GSFO the agency should not tier to the out of date document at all. In order to satisfy the law, BLM must undertake thorough cumulative impact analyses of individual project proposals until broader planning documents are updated or revised. Tiering to out-of-date planning documents is clearly inappropriate.

We are aware that the GSFO is currently revising the Resource Management Plan (RMP) and will likely update foreseeable development scenarios for oil and gas development during that process. Nonetheless, the agency cannot rely on cumulative impact analyses undertaken in outdated planning documents. Until planning documents are updated, tiering shall not occur.

Importantly, the BLM is well aware of its obligation to supplement an inadequate EIS when changed circumstances or new information render the old EIS outdated. In 1999 the agency amended the oil and gas portion of the 1991 RMP for this very reason. At that time, oil and gas development far exceeded projections made in the 1991 FEIS and anticipated impacts were unhelpful to meaningful environmental analyses.

> **Response:** The cumulative impact analysis of the Orchard Master Development Plan was not tiered to the 1999 Glenwood Springs Oil and Gas Leasing and Development. Instead, a watershed-based analysis, specific to this project, has been conducted to assess the impacts of this proposal in addition other past, present, and reasonably foreseeable future actions (see the **Cumulative Impact** section of the document).

[1] The Final Oil and Gas SEIS produced by the BLM in 1999 projected a reasonably foreseeable development scenario of 1,200 wells over the next twenty years. *See* GSRA, Oil and Gas Final SEIS (1999), at ES – 7). Estimates of oil and gas development on BLM lands within the GSFO given several months ago tell of 907 producing wells, 233 not-yet-producing wells that were drilled or being drilled, 25 wells that were shut-in, and 9 temporarily abandoned wells. *See* Telephone Interview with Jennifer Gallegos, Bureau of Land Management, Glenwood Springs Energy Office (Nov. 7, 2007). Adding producing wells and soon-to-be producing wells generates a sum of 1,140 wells. This estimate is several months out-of-date and just 60 wells short of development estimates for the year 2019 projected in the 1999 SEIS. Depending on how many wells will be drilled on the GSFO, this 95 well proposal will likely result in exceedance of anticipated drilling levels.

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